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Burleigh's Pneumatic Rock-Drill.

THE saving of labor and the consequent saving of expense is not the principal advantage of many new inventions. The saving of time is often of much greater importance. In some localities—in New-York City, for instance—it takes months to blast away the rocks, which not only occupy the space to be used for cellars and sewers, but often rise to the height of thirty or forty feet above the level of the ground. With the assistance of the drill which is the subject of this article, the same amount of rock may be removed in as many weeks, as months, by the old method, and that with a less number of workmen. This is, of course, of great importance in a city where the houses are occupied as soon as completed, and where impediment to travel by the building of sewers is a public loss to be avoided as much as possible.

Burleigh's drill is, in form, similar to a large heavy painter's easel. The place for the picture upon the easel is occupied, in this case, by a cylinder and piston, which may be worked directly by means of steam, or by air compressed by the means of a steam-engine placed at any distance required. For drilling in the open air, this steam-boiler may be placed near the drill, and the steam employed at once; but for working in the shafts of mines or tunnels, it is more convenient to have the boiler outside, connected with an engine compressing the air. The air is then, by means of tubing, conducted to the drill. The small amount of loss, which is only about fifteen per cent, occasioned by the use of this medium, as a means of transferring the power, is fully compensated for by the utility of the escaping air, for the purposes of cooling and ventilation. At the celebrated Hoosac tunnel, these drills have been in use for more than three years, and it is doubtful whether without their assistance this gigantic work could ever be accomplished. The boiler and engine for compressing the air are outside the tunnel, at the distance of one and a half miles from the point where the drills are worked. Eight of these are worked at one and the same time. The escaping air contributes greatly to the comfort of the laborers, and removes at once all gases, etc., that result from the blasting operations. The drill is attached directly to the piston-rod, with which it moves up and down, exactly on the principle of that class of steam-hammers. It may be made longer or shorter according to the necessities of the case. During the operation, which consists in striking the rock at the rate of from 150 to 250 blows per minute, the cylinder, piston, and drill are automatically advanced or lowered by means of a screw, in accordance with the amount the drill penetrates the rock, forward or downward, the drill being rotated at the same time.

Five sizes of these drills are made, drilling holes from $1\frac{1}{2}$ to $5\frac{1}{2}$ inches in diameter; the sizes generally used are those from 1 to $2\frac{1}{2}$ inches. Thirty-six inches in depth can be drilled without a change of drill-points. We ought to add that in these drills, the steam required for each amounts to about three-horse power, with a pressure of 50 pounds to the square inch.

At the moment of going to press, we receive the information that it has been decided to use these drills in the work of removing the obstructions in Hell-Gate channel, New-York. The idea is to work upon a plan similar to that employed at Chicago in working the tunnel underneath the lake for providing water for the city, only in place of the clay which there forms the bottom of Lake Michigan, and which can be cut, as it were, like cheese, we have all rock to be excavated. Near the shore, a large coffer-dam or caisson is being sunk, and the soil removed until the rock is reached. Then the boring and blasting will commence, and go on until a sufficient depth has been reached, whereupon the process of tunnelling under the rocky bottom of Hell-Gate will commence by means of the Burleigh drill. After the middle of the proposed channel has been reached, ramifications will be made in different directions, blasting material placed in the main tunnel and all its branches, and all of it exploded at once. It is expected that the whole reef will be scattered and fall into the deep recesses adjoining, clearing a channel of at least twenty-five feet depth of water, so that even the *Great Eastern* would be able to enter New-York harbor by way of Hell-Gate, as well as by Sandy-Hook. We ought to add that the above-mentioned plan is that of General Newton, the accomplished United States Engineer in charge of the improvements.

The invention of the Burleigh rock-drill may therefore be considered as marking an important date in the history of the commerce of the city. It is now in successful operation in New-York city, and at various points throughout the United States. It may be well to state, that this drill has been patented, and is about being introduced into Europe. J. T. & W. H. Daly, 43 New Street, New-York, are the sole agents and managers for the United States, to whom all communications may be addressed.

BURLEIGH'S PNEUMATIC ROCK-DRILL.

The Hydraulic Swing-Bridge Over the Ouse.

THE following paper, by Sir William Armstrong, one of the most celebrated among mechanical engineers, was read on the 3d instant before the Institution of Mechanical Engineers, and published in *The Engineer*, from which we transfer it to our columns. The paper runs as follows:

The formation of the Hull and Doncaster section of the North-Eastern Railway necessitated the crossing of the river Ouse by an opening bridge, so as to admit the passage of the important traffic carried on in large sailing-vessels. It was also necessary that there should be not more than one pier in the navigable channel, with a clear opening of not less than one hundred feet on each side. The requisites of the railway and river traffic necessitated a construction that admitted of being opened and closed very rapidly. It was also necessary that the power applied should be capable of controlling with great accuracy the momentum of so ponderous a mass, and hydraulic power was therefore selected as the agent. The instances in which hydraulic power had been previously applied to the opening and closing of movable bridges are very numerous. Most of these bridges have been erected for the passage of railway traffic, and they may be divided into three classes. First, swing-bridges, on which the bridge is lifted from its solid bearings by a central press previously to being turned; secondly, swing-bridges, on which the bridge rests upon a circle of two rollers; thirdly, draw-bridges, on which the movable platform is drawn back and pushed forward in the line of the roadway. In addition to the hydraulic bridges comprised in these three classes, there is one example of a bridge on the bascule plan being worked by hydraulic power. This is at Liverpool, over one of the dock entrances. The first hydraulic swing-bridge was erected in 1852, over the river Severn, on the Gloucester and Dean Forest Railway, and the first hydraulic draw-bridge was erected in 1853, over the river Tovey, on the South-Wales Railway, near Carmarthen. All the swing-bridges which turn on a centre pier and span an opening on each side, have been made to turn on live rollers without being lifted; because, in bridges of that construction, neither extremity can have any steadying support in the act of turning; but, in some instances, a central press has been applied to relieve the rollers of part of the weight. Where single-leaf swing-bridges are lifted by a central press, the deflection is taken off by letting down the bridge on its solid bearings when closed; but in the case of draw-bridges and swing-bridges not lifted by a central press, hydraulic machinery is applied to lift the overhanging end or ends, so as to take off the deflection after closing. The openings crossed by these various forms of bridges have varied from 30 ft. to 100 ft. span. The heaviest bridge to which the central lifting arrangement has been applied is one over the Regent's Canal, near the London Docks, in which instance the weight lifted and turned amounts to 450 tons. In bridges with the central press, the head of the lifting-ram fits into an inverted cup upon the bridge, to allow of oscillating movement, and the bridge in swinging turns upon the water by carrying the ram round with it. The pressure of water employed in the central hydraulic press is about 800 lbs. per square inch; and in the largest of these bridges the diameter of the ram turning upon the water is 51 in. In most cases the bridges are in connection with a system of hydraulic pressure applied to cranes and other machines in the vicinity, the pressure being supplied in the usual manner by steam-engines pumping into accumulators. But in some few instances, where there is not such a supply of power at hand, the pressure is supplied by hand-pumps charging the accumulator, and thus storing up the power ready for application whenever required.

At the Ouse Bridge there was no supply of hydraulic power at hand, and in that instance the total power required was too large to be supplied by hand-labor. It was further necessary, on account of the position of the swing-bridge, either to convey the power to the centre pier by a pipe under the bed of the river, or to produce it upon the pier by placing a steam-engine within the pier itself, and the latter plan was adopted. The construction of the bridge was shown in accompanying diagrams. The total length of the bridge, fixed and movable, is 830 ft. The fixed portions consist of five spans of 116 ft., from centre to centre of piers. The bridge being for a double line of railway, each span is composed of three wrought-iron girders of the bow-string form, the centre girder having a larger section to adapt it for its greater load. These girders have single webs, and are 9 ft. deep in the centre. The total width of the bridge, from outside to outside is 31 ft. Each of the piers for the fixed spans consists of three cast-iron cylinders, of 7 ft. diameter and about 90 ft. in length. The depth from the under side of the bridge to the bed of the channel in the deepest part is about 61 ft. The headway beneath the bridge is 14 ft. 6 in. from high-water datum, and 30 ft. 6 in. from low-water. The swinging portion of the bridge consists of three main wrought-iron girders, 250 ft. length and 16 ft. 6 in. deep at the centre, diminishing to 4 ft. deep at the ends. The centre girder is of larger sectional area than the side girders, and, instead of being a single web, is a box-girder 2 ft. 6 in. in width, with web plates of $\frac{7}{16}$ in. to $\frac{5}{16}$ in. in thickness, and the top and bottom booms contain about 132 square inches of section. The roadway is carried upon transverse wrought-iron girders resting upon the bottom flanges of the main girders. In the centre of the bridge, the main girders are stayed by three transverse wrought iron frames, securely fixing them together; and over the top of these frames a floor is laid, from which the bridgeman controls the movements of the bridge. An annular box-girder, 32 ft. mean diameter, is situated below the centre of the bridge, and forms the cap of the centre pier; this girder is 3 ft. 2 in. in depth, 3 ft. in width, and rests upon the top of six cast-iron columns, each 7 ft. diameter, which are arranged in a circle, and form the centre pier of the bridge. Each of these columns has a total length of 90 ft., being sunk about

20 ft. in the bed of the river. A centre column, 7 ft. diameter, is securely braced to the other columns by a set of cast-iron stays, which support the floor of the engine-room. This centre column contains the accumulator, and forms the centre pivot for the rotation of the bridge. The weight of the swing-bridge is 670 tons. There is no central lifting-press, and the entire weight rests upon a circle of conical live rollers. These are twenty-six in number—3 ft. diameter and 14 in. width of tread—and are made of cast-iron, hooped with steel, and they run between two circular roller-paths, 32 ft. diameter. These roller-paths are 15 in., and are made of cast-iron, faced with steel; the axles of the rollers are horizontal, and the two roller-paths are turned to the same bevel. The turning motion is communicated to the bridge by means of a circular cast-iron rack, 12½ in. wide on the face and 6½ in. pitch. It is shrouded to the pitch-line, and is bolted to the outer circumference of the upper roller-path. It gears with a vertical bevel-wheel, which is carried by a steel centre-pin, supported on the lower roller-path. This is driven by a pinion connected by intermediate gearing with the hydraulic engine. There are two of these engines, duplicates of one another, either of which is sufficient for turning the bridge. The force required to turn the bridge is equal to about ten tons applied at the radius of the roller-path. Each hydraulic engine is a three-cylinder oscillating engine, with simple rams of 4½ in. diameter and 18 in. stroke. These engines work at forty revolutions per minute, with a pressure of water of 700 lb. per inch, and are estimated at 40 horse-power each. The steam-engines for supplying the water pressure are also in duplicate, and are double cylinder-engines, drawing three-throw pumps, 2·8 in. diameter and 5 in. stroke, which deliver into the accumulator. The diameter of the steam cylinders is 8 in., and the stroke of the piston is 10 in, each engine being 12 horse-power. The accumulator consists of 16½ in. ram, with a 17 ft. stroke, and is loaded with a weight of sixty-seven tons, the weight being composed of cast-iron segments suspended from a crosshead and working down in the cylindrical casing formed by the centre cylinder.

For the purpose of obtaining a perfectly solid roadway, when the bridge is in position, for the passage of trains, and also for securing the perfect continuity of the line of rails, the following apparatus is applied: Each extremity of the bridge is lifted by a horizontal hydraulic press, acting upon levers forming a toggle-joint, the piers having rams acting in opposite directions upon two toggle-joint levers, which act one upon each side of the end of the bridge, and they are connected by a horizontal bar, which is confined by a stud sliding in a vertical guide, so as to insure parallel action of the two toggle-joint levers, and producing exactly parallel lifting of the two sides of the bridge. Three resting blocks, one under each girder, are pushed home when the end of the bridge is lifted, by means of two separate hydraulic cylinders, and the bridge is then let down upon the resting-blocks by the withdrawal of the toggle-joint levers, and the bridge ends are then perfectly safe for trains to pass over. The hydraulic cylinders for this fixing-gear at the two ends of the bridge are worked by the bridgeman from the centre platform by means of two levers, and, for the purpose of enabling him to regulate the stopping of the motion of the bridge at the right place, an indicator is provided, consisting of a dial upon a pedestal. This dial has two pointers, which are actuated by the motion of the bridge. One of these pointers makes two revolutions, and the other forty-two revolutions for one complete rotation of the bridge. These pointers are similar to the hour and minute hands of a watch, the slower pointer being analogous to the hour-hand, and the quicker one to the minute-hand. The bridge has no stop to its movement, and would swing clear past the right position if the turning-power were continued; but the bridgeman, being guided by the indicator, knows when to stop and reverse the hydraulic engines, for the purpose of stopping the bridge in its right place. When this is done, a strong bolt, three inches thick, in each end of the bridge, pressed outward by a spiral spring, is shot into a corresponding notch in the fixed girder-work, so as to lock the bridge; and when the bridge is required to be opened, these bolts are withdrawn by a wire cord leading to the platform on which the bridgeman is stationed. As the accumulator is stationary, and the fixing-gear at the ends of the bridge travels with the bridge, the communication of water-power is made by a copper pipe passing up in the axis of the bridge, through the middle of the centre girder, having a swivel joint at the lower end. Also, as the hand-gear for the bridgeman rotates with the bridge, while the hydraulic turning engines are stationary, the communication for working the valves is made by a copper rod passing down through the centre of the above pressure-pipe in the axis of the bridge. This rod is connected by levers direct with the regulating valves of the hydraulic engines, and the engines are reversed in either direction by the action of a small hydraulic cylinder, which is governed by the movement of a three-port valve, actuated by this rod from the bridgeman's platform. The cylinders for working the fixing-gear at the ends of the bridge are worked by valves placed upon the centre platform, in reach of the bridgeman, the pipes between the valves and the cylinders passing along the side of the roadway of the bridge. The time required for opening or closing the bridge, including the locking of the links, is only half a minute, the average speed of motion at the extremity of the bridge being 6½ feet per second. For the purpose of insuring safety in the working of the railway line over the bridge, a system of self-acting signals is arranged, that is actuated by the fixing-gear at the two ends of the bridge, and a signal of "all right" is shown by a single semaphore and lamp on the fixed part at each end; but this cannot be shown until each one of the resting-blocks and bolts is secured in its proper place.

On the Physical Geography of Brazil.

BY PROFESSOR C. FRED. HARTT.

Ordinary maps are wretched affairs so far as topography is concerned. They may give with more or less exactness the hydrography of the region they represent, but in its topography they are as apt to mislead as to furnish correct information. Maps of countries well surveyed are bad enough, but when we come to those of countries not well known, as South America for instance, one can put very little trust in even the best maps, so far as their representation of the inequalities of the surface is concerned. It seems to be generally thought that the water-shed between two river-basins must be a range of hills or mountains, corresponding in magnitude, height, etc., to the extent of the basins it separates, and the map-maker feels at liberty, in addition to the mountain-ranges well known, to encircle each of the river-basins of his map with a range of hills. If he desires to be especially accurate, he represents these as sending off branches separating the affluents of the river system he is representing. This is simply abominable, and the student of physical geography is as often perplexed as aided by the maps he has to consult. Water-sheds are not always sharp ridges. Swellings of the surface, so low as not to be observed by him who passes over them, may form the dividing lines between great river systems, or streams may rise in a wide, perfectly horizontal, elevated plateau. To represent by *haché* lines either of these water-sheds at a narrow ridge would be to convey an erroneous idea, vastly more serious in the estimation of the physical geographer than an error in latitude or longitude in the location of a town. Continents are organisms, and, like animals, have their anatomy and physiology. He who would understand the structure of an animal not only needs a correct idea of its outline, but of all the organs which go to make up its body.

In a continent, the configuration of the soil, its mountains, and hills, and valleys, all depending on geological structure, are elements of the first importance, for these determine the course and navigability of rivers, the climate, the habitability—in short, the whole *life* of the land.

A map of Brazil, even the best yet published, gives one an exceedingly inadequate and erroneous idea of the topography of the country. The empire is represented as being traversed by a network of mountain-chains, apparently of very nearly equal importance, roughening the surface of a country otherwise almost flat. But Brazil is not an immense low flat. Excepting the plains of the valley of the Amazonas, the country forms an immense plateau, elevated about two thousand feet above the surface of the sea. This plateau is on the north separated from that of Guiana by the wide plains of the valley of the Amazonas. On the west it is separated from the Andes by the valleys of the Madeira and the basin of the Paraguay. From the Amazonas to Cape St. Roque runs along the coast a strip of low lands, which is continued southward with a varying width to the province of Rio de Janeiro, to the south of which these low lands become of very little importance, and only occasionally fringe the coast, the edge of the plateau being washed by the sea. So the Brazilian coast, to the traveller coasting along it from Para southward to Rio, appears, sometimes for hundreds of miles, a dead level, but little raised above the surface of the sea, the edge of the plateau being too far inland to be seen. But here and there, as in Ceará, Pernambuco, Bahia, and especially along the coast of Espirito Santo, Rio de Janeiro, and thence south, high lands are seen from the sea, stretching, like a mountain-wall, along the coast. In the southern part of Brazil, these go by the name of the Serra do Mar, or the coast-cordilheira. On maps they are always carefully represented as a narrow mountain-chain, with a counter slope on the landward side, but this is very erroneous. There is, in fact, no continuous serra running along the coast. It is the edge of the great plateau that is seen—roughened, it is true, with short ridges—which, often approaching the sea obliquely, break down on reaching the coast. Sometimes short ranges stand in advance of the plateau, and these, as the group of Tijuca, Corcovado, etc., at Rio, may be even four thousand feet in height.

Along the coast of São Paulo, the Serra do Mar, some three thousand feet in height, runs along close to the coast, with a very steep slope to the sea, only a very narrow strip of marshy and sandy land lying between its foot and the ocean. From Santos on the coast to São Paulo in the interior a railway runs over the Serra. Leaving Santos, one goes over the low grounds to the foot of the Serra, and is then drawn by stationary engines up the Serra to a height of about two thousand feet, when the top of the Serra is gained; but, instead of finding a counter slope on the opposite side, one finds himself on the edge of a table-land running back into the country, roughened near its border with hills, but stretching away in the interior beyond the mountains of St. Paulo, to a series of plains that slope off toward the valley of the Paranahyba. The river Parahyba do Sul, which takes its rise in the province of São Paulo, and runs close to and almost parallel with the sea through the whole length of the province of Rio de Janeiro, isolates by its valley the range of the Serra do Mar from the Serra da Mantiqueira, which lies on its northern side, and is the higher of the two. Burton has called attention to this fact as illustrating the law that the highest mountains are generally not on the very edge of a plateau, but just inside. The highest point in the Serra do Mar is in the Serra dos Orgaos, near Rio, which is about eight thousand feet high; but the peak of Itatiaiossú in the Serra da Mantiqueira is between nine and ten thousand feet, according to late measurements, and this appears to be the highest point in Brazil, the peaks of Itacolumí and Itambé being very much lower.

The serras forming the water-sheds between the heads of the basins of the Rio Grande, the Rio São Francisco, and the Rio Doce, are a high, abrupt range of hills. The Serra do Mar and the Serra da Mantiqueira are composed of gesoic gneiss. The mountains about Ouro Preto are of metamorphic rocks of various kinds, probably all of the older Palæozoic, but all so much disturbed that their relation to one another is not easy to make out. The base of the whole plateau to the northward is made up of similar rocks. Along the water-shed between the São Francisco and the rivers eastward, as well as between it and the basin of the Tocantino, in the Province of Goyaz, and of the Parnahyba, in the Province of Ceará, these same rocks form ridges southward near Ouro Preto, of considerable altitude, but they grow lower in going north, taking on rather the character of broad swellings than of mountain-chains, and the same may be said to be true of the water-sheds running westward between the Rio Grande and the Paranahyba branches of the Paraguay, and of the country at the water-shed between the great river flowing north into the Amazona, and those flowing southward into the Paraná. The serras running northward and westward from the head-waters of the São Francisco flatten gradually out, and the plateau, so far as its basis of metamorphic rocks is concerned, grows more even in surface and with more swelling outlines. The highest points of the plateau are in its south-eastern corner, north of Rio. The plateau appears to have a gentle slope westward toward the Andes. There is no great mountain-chain running westward through Brazil, as is commonly supposed. The water-shed between the basins of the Amazona and the Paraná is a series of elevated plains. During the Tertiary*, the whole plateau sunk to a depth of over 2000 feet below the present level of the sea. The waters of the sea covered the plateau on almost all sides over very large areas, and the waters penetrated deeply into the great river-basins of the Paraguay, the São Francisco, the Tocantino, etc. In this submersion, the plateau of Guiana appears to have participated, though we know not to what extent. The Amazonas formed a Mediterranean. The waters deposited in the river-basins, and over the submerged part of the plateau, thick beds of sand and clays. This material was apparently derived from the decomposed surface of the country, for it seems to be a deposit which was rapidly formed. Even the swelling divides between the river-basins—were covered, and the smaller basins, divides and all, were reduced almost to the same level. Then the land rose, and the surface waters and the sea began the gigantic task of denuding this material. Rivers, choosing in some instances the depressions of their old valleys, as was the case with the São Francisco, cut for themselves *cañons* through this loose material and wore it away, carrying it off to the sea, to be deposited in similar beds along the shores, and the work of denudation went on until over very large areas these strata were removed. Then came on the glacial period, which, with the evidence before us, we cannot deny to Brazil, and this aided in the denudation. Since then the surface-waters have swept these tertiary beds away entirely from over immense tracts, as, for instance, in some parts of the mountainous country; but we still find them in the basin of the Jequitinhouha, and the Rio Grande, and the São Francisco, covering very large areas, forming immense elevated plains. In the south, where the more abundant moisture and the more extensive action of the glaciers have subjected the country to greater wear, these deposits present a gently undulating surface, while in the north they are flat as the sea, and with as boundless a horizon. Such are the Chapadão de Ste. Maria, and the Chapadão de Urucuia in Minas. The Chapadas of the Jequitinhouha and of the Serras da Ibiapaba and Araripe in Ceará. A very interesting fact which has not, I believe, been called attention to before, is that the present water-sheds between some of the river systems consist of wide strips of these tertiary rocks running along the tops of the old water-sheds of metamorphic rocks, these strips forming elevated plateaux or *chapadas*. Isolated hills of these materials are found not unfrequently in some of the river-valleys.

Of the rivers which descend from the plateau, none are navigable to any great distance, except on their lower courses after they have left the high lands. Along the coast, where the low lands are narrow, a few rivers admit of navigation, with some difficulties, for a few leagues, or, as in the case of the São Francisco, for a distance of 164 miles by steam; but, usually, on reaching the edge of the plateau, dangerous rapids, and, in some cases, splendid falls and cataracts, are met with, which put an end to all navigation except by canoe. The Jequitinhouha affords navigation to the edge of the plateau, where rapids begin; but the river leaves the level of the plateau a few leagues west, descending, by a splendid series of falls, into a deep and narrow valley cut through the gneiss rocks. The São Francisco, in like manner, many leagues before it leaves the plateau, plunges, in a magnificent series of rapids, into a narrow gorge which it has hollowed for itself to the low lands.

Along the Brazilian coast, from the province of Rio Grande do Sul northward to Bahia, the country is exceedingly heavily wooded, and this belt of rich forest vegetation extends over the edge of the high lands, to a greater or less distance, into the interior. This becomes narrowed down as one goes northward of Espirito Santo. In the southern provinces this

* Lund, Gardue, and others would say Cretacean, or, at least, Secondary; but I hope to be able to show in my forthcoming volume, that the formation of which I speak is Tertiary.

forest belt, the non-navigability of the rivers, the mountainous character of the country, and the want of roads, make the interior provinces of the empire difficult of access, and commerce is carried on with them with great difficulty. The forest belt, except on navigable streams near the coast, or in the vicinity of large towns, is almost uninhabited.

The Quicksilver Mines—The Ride to the Geysers.

Two excursions from San Francisco into the beautiful scenery of the Coast Range and its foot-hills, one northward and one southward, are well worthy of the tourist's attention. The outlay of time and money is small in either case; and the reward in pleasure and instruction is great. I refer to the excursions to New-Almaden and to the Geysers. The former, with its pleasant railway-ride along the Bay, to the city of San José, and its picturesque drive through the valley and among the hills to the Quicksilver mines, I performed and described last year.

The mines, which then seemed to have taken a new lease of life and prosperity, are now in a bad way. The *labores* which promised to be productive a year ago are now nearly exhausted; and the Company's explorations have failed to reveal, thus far, any new and extensive bodies of rich ore.

The reader may remember that, by the terms of the combination among the New-Almaden, New-Idria, and Redington Companies, the New-Almaden mine is allowed to produce 24,000 flasks annually, which is, I think, only half the capacity of the reduction-works. But this year the mine is not even doing its permitted share. The production is only about 1500 flasks per month; and, unless further discoveries of ore are made, there will be a greater falling off. It is true that fluctuations of this kind have repeatedly occurred in the history of the Company. None of the quicksilver mines of this coast have regular deposits which can be relied upon for permanent work. The ore is scattered through a belt of rock; and great expense is incurred in constant prospecting and opening new *labores*, or stopes. Whether the condition of the Quicksilver Company is more desperate this time than ever before, I am not prepared to say; but I fear that a considerable outlay will be required for the necessary explorations (by means of a deep tunnel), which, in view of the uncertainty of results, it will be difficult to obtain. In the absence of thorough prospecting, on the other hand, the end will be certain.

Probably this state of things will both stimulate the production at other mines and bring out some new enterprises, which have hitherto been prevented by the commercial as well as the mining risks involved. In any case, the supply of quicksilver will not fail; for our old enemy, the Almaden of Spain, stands ready, with an immense body of ore and 100,000 flasks of quicksilver on hand, unsold, to supply any deficiency. "For a' that and a' that," the trip to New-Almaden is just as lovely as ever; and I wish I had the time to do it this season.

I chose, on my way northward overland to Oregon, to turn aside and visit the Geysers; and I was well repaid for the labor incident to the rapidity with which I was obliged to carry out the plan. In going over the road with my readers, however, I shall not hurry so much. In a journey of the fancy, where almanacs and clocks and hotel-bills and business elsewhere and stern official duty are all alike imaginary, one may "make believe" stop a week, instead of an hour, at any point that pleases him. If you would visit the Geysers from San Francisco, you should take the steamboat for Vallejo, at four in the afternoon. On the way, besides admiring the beautiful bare hills that bound the bay, you have time to enjoy an excellent dinner; and at six o'clock, running up the strait that divides Vallejo from the naval station of Mare Island, the steamer delivers you on the pier to the Napa Valley cars. In a short time you are gliding through one of the most charming and fertile valleys of California. The hills are no longer bare nor the meadows sterile. Great fields of grain, or of yellow stubble where lately was grain, stretch away on either side; and where these are not, nature has planted wild oats, that wave and ripen, and put the appearance of husbandry upon all neglected places. The landscape is dotted with magnificent oaks, and looks more like a cultivated park than a region so recently made the habitation of men. Sheltered on both sides by ranges of hills, subordinate to the Coast range, this valley possesses a climate far milder and more equable than that of San Francisco, where fogs, and winds, and dust are frequent annoyances. Napa City, Calistoga, and other points are favorite watering-places for the San Franciscans; and in this volcanic belt that skirts the coast there is no lack of excuses for a spa, if the occurrence of some mineral spring, either nasty or sparkling, be necessary to justify such a step. New-Almaden has its Vichy water, Napa its natural soda-water, Calistoga its various hot springs, and the Geysers cap the climax with their diabolical variety and abundance. The season for sojourning out of town is spring and early summer. Already the watering-places are dull and half deserted; for San Francisco is more tolerable than in the colder fogs and winds of May and June. This year, in particular, has not been so good as usual for the regular business of the watering-places. Too many distinguished visitors have come to San Francisco by the Pacific Railway. People have preferred to stay in town and see the notables. Besides, a good many Californians have taken the opportunity to visit the old folks and the old places in the East. In fact, as might have been, but was not, expected, the tide of transcontinental travel has been heavier from the Pacific to the Atlantic than in the direction followed for so many years by the persevering star of Empire.

The train stops at Calistoga, where it is necessary to spend one night, and advisable, if time permits, to stay a day or two, enjoying the baths and fine scenery. The Hotel is a village by itself. The guests eat and drink, and pound the piano at the large central building, and are lodged in pretty cottages, scattered through the grounds. As it never rains during the season, this arrangement is completely comfortable and delightful. Of course, splashing over to meals in a shower would be a nuisance. But for this one drawback, I think this casino system, already not unknown at our Eastern watering-places, would meet with great favor even for transient guests. At Calistoga, it is thoroughly pleasant. How different is this ornamental dwelling, with its veranda and parlor and bedrooms, all *parterre*, from the stifling, fourth-story cupboard in which one is likely to be shelved for the night at Saratoga or Long Branch! In front of the veranda grow in flourishing harmony a pine-tree and a palm; and as one sits in the moonlight that sifts through them to his feet, the balmy air seems to contain the stimulant coolness of the North and the spicy languor of the South at once. Elsewhere, this system might be considered a little defective in the means of communicating with waiters and messengers. If you want any thing after you have been shown to your domain—which is either the Revere, Adelphi, Delevan, or some other distinguished name—you must walk across the grounds to headquarters. But in point of fact, you do *not* want any thing, except to be let alone in your sweet peace and comfort.

Next morning, after breakfast at six, the stages come to the door—strong, open wagons, each drawn by four horses. It is twenty-six miles to the Geysers. The first dozen are done in an hour, at a swinging trot or a full run, over the smooth road. Then begins a slow ascent; and in the next seven miles we rise four thousand feet. The road is a new one, just finished by Chinese laborers. It is what they call here a "grade"—that is, a road laid out by survey, to climb along the side of a mountain with a general uniformity of inclination. Where gullies or small ravines are met, of course the road must turn into them for a greater or less distance, to preserve the grade. It is consequently full of sharp curves, either around jutting points or at the heads of side-gullies; but, though too narrow for two vehicles to pass, except at intervals, it is smooth and firm. On one side, as we ride, rises the bank of earth or rock out of which the road has been hewed; and on the other side the steep face of the mountain stretches downward into rolling valleys or forest shadows; beyond which a far prospect of hill and plain is unrolled, growing ever wider and more beautiful as we attain to greater heights.

But I told you in the beginning that I should not hurry myself with this trip; and right here, where you do not expect it, I propose to get out of the wagon, lie down on the ground and go to sleep. What shall you do? I don't know nor care; go to sleep, too, if you like. If you happen to be near when I wake up, we will drive to the Geysers together.

CALISTOGA, CAL., July 27th, 1869. R. W. R.

Street Pavements.

THE PARISIAN SYSTEM.

THIS system has, since 1854, manifested strong preference for the asphalt road upon the concrete foundation. In 1854, 960 square yards of asphalt road were laid in Paris, and since then the use of the material has steadily increased, until, at present, it is ranked as well adapted for purposes of heavy traffic on the most frequented thoroughfares. Up to 1866, 96,000 square yards had been put down; in 1867 the surface added was 54,000 in Paris proper and 84,000 in all in the department of the Seine, making a total in thirteen years of 180,000 square yards. The contract of the Cie Générale des Asphaltes with the city of Paris covered at that date at least 96,000 square yards more, to be put down in 1868 and 1869. The ancient streets of Paris were without sidewalks, and were paved with large square blocks, with grades sloping from the sides to the middle, forming a gutter on the central line. Sidewalks began to appear in 1825, and in the same year the reversal of the surface, bringing the gutter to the sides, was introduced. In 1852 the system of MacAdam was applied to the old boulevards, and in 1858 this method was improved for heavy traffic by introducing margins along the sides, from two to four yards in width, paved with small blocks of Belgian porphyry—the germ of the sidewalk as now used. The whole surface of streets and sidewalks is now constituted as follows:

	SQUARE METRES.
Streets—Paved	4,833,643
Macadamized	2,146,005
Of asphalt	165,154
Total	7,195,302
Sidewalks—of granite	545,939
Paved	14,024
Bituminous	1,192,414
Total	1,752,377
Grand total	8,947,679
Equivalent in square yards to	10,701,416

The relative cost of the three as constructed is worthy of attention, and may be added, together with the annual cost of repairs, to the square yard. The generalization exhibits the following figures:

	COST PER SQ. YD.	ANNUAL REPAIR.
Asphaltic road	$2 50	25
Belgian porphyry pavement	3 00 to $3 67	08¼ to 25
Macadamized	1 17	42 to 50

The first cost of asphalt streets is greater than that of macadamized, while the cost of repairs is considerably less; and, again, the first cost of the asphalt is less than that of the Belgian pavement, while the expense of repairing is greater. The asphalt coating, one sixth of a foot thick, is supported upon a roadbed of concrete, composed of ninety parts gravel to forty parts of mortar, about a quarter of a foot in thickness, and resting upon the compacted soil-bed beneath. Provided the requisites of thorough surface and under drainage have been observed, the asphalt roofing being utterly impervious to water, the roadbed of concrete waxes harder and drier with age, and, once made, is imperishable. Repairs are easy, and consist simply in cutting away the damaged roofing of asphalt and replacing it with new. As compared with the Belgian pavement, the liability to fall of horses being driven over the asphaltic road is 1 in 1409 to 1 in 1308 on the former, proving the superiority of the asphaltic surface in this respect—that is, in surety of foothold.

The concrete known as *béton Coignet* differs from the ordinary roadbed concrete in being an artificially formed sandstone of great durability and strength, and of extensive application in civil engineering in all its ramifications, from the manufacture of sewers to the construction of aqueducts, from the fabrication of roadbeds to that of underground vaults of the utmost possible capacity. The best *béton* endures a rushing strength four and three fourth times that of the best brick, fifty per cent greater than that of limestone, fifty per cent greater than that of sandstone, and about forty per cent less than that of the strongest granite, to thirty-five per cent more than that of the inferior qualities. For common use a good *béton* is compounded of four parts of sand and one part of fat lime, to which, for extra strength, one half part of Portland cement may be added. It could be manufactured here at an expense of four dollars per cubic yard, and for roadbed, a quarter foot thick, at sixty cents per square yard. An excellent concrete road might be constructed of it at half the scheduled expense of the Fisk concrete pavement, its durability being about the same as that of the best quality of sandstone. The embankment on which runs the Avenue de l'Empereur, at the Trocadere, is supported by a wall of this material forty feet in height, for the distance of a quarter of a mile; and, in general, the subject of its application is now being discussed and experimented upon by the best engineers in France, with a view to extend to the utmost the constructive capacity in engineering of so inexpensive a material as that developed by the invention of M. Coignet; while in the sewerage system it is rapidly superseding every thing else. In it no doubt is, at the end, to be sought the solution of the sewerage problem in this city, if the administration thereof ever falls, with the needed powers of discretion, into the hands of a competent board of engineers. What is wanted in the problem is the boldness to break loose from worn-out ideas and apply the best invention of the age to the development of a better and more adequate system—a quality which has been startlingly exhibited, with equally startling and successful results, in the administration of the Departments of the Seine and in the construction of public works in Paris for the past ten years.

Most foreigners travelling in France remark the excellence of the macadamized roads, and not unfrequently suppose that there must be something peculiarly favorable in the nature of the soil or something unique in the method of construction. The supposition is not true to fact, however; the quality of the roads in France being attributable to good engineering and care and exactness in all the processes of construction and preservation. In fact, in the system of Trésaquet and Simplon the system introduced into England by MacAdam in 1816 had been anticipated more than half a century. MacAdam copied Simplon in his road-bed, while Telford did nothing more than return to the system founded by Trésaquet in place of the still earlier road-bed of flat stones. The roads of France are simply illustrations of what may be done by good construction rather than of any superiority of facilities; those of the city of New-York are to a great extent examples of the result of slovenly construction with sufficient facilities for the best of work. And this leads to the general principle, that of the several pavements in use any one is practically good enough for all purposes when well constructed. The defect is not in the theory of the pavement itself, but in the defective and slovenly application of it under the contract system. As in railroad-building, with the result of innumerable accidents, so in street-paving defective road-bed is the great sin of the contractor; and, as in railroad-building, the United States cannot be compared with France or England for thoroughness and attention to the details which result in perfection, so, in the matter of pavement and the laying of it, American contractors on the average are slovenly and inefficient. Contracts for street-paving are annually awarded in this city to persons whom a competent European engineer would not trust as workers under a superintendent; and thus, through ignorance in many cases, through greed in many cases, through both together existing in many cases, it is seldom that New-York can boast of a section of pavement properly put down with due attention to all details. What is

THE COMING PAVEMENT,

or which, of the several kinds now bidding for popular favor, is a question not easily answered. As a rule, competent engineers express doubts as to the merits of the Nicolson, and of wooden pavements of all patterns. In the Nicolson structure the road-bed is of sharp, clean sand, of the proper thickness. A basis is then made by laying common boards, dipped in hot coal-tar, lengthwise on stringers of like material laid from curb to curb. The blocks forming the superstructure are of Southern hard pine, three by four, and are set on end in rows,

crosswise of the street—the blocks before setting being dipped to half their length in a bath of hot coal-tar. Between the rows of blocks intervene pickets of thin boards set on edge and leaving an opening between the rows of blocks, of a foot or nearly in depth. This opening is filled with clean screened gravel rammed down with a pavior's rammer, and an iron blade made for the purpose, and the surface is covered with hot coal-tar. The gutter exhibits its lowest point half a foot from the curb. The whole surface is covered with coal-tar sufficiently boiled to be tough and fibrous, but not brittle, upon which is sprinkled a layer of fine gravel and common sand. The Stafford pavement differs from the Nicolson in the laying of large blocks prepared after the Seely patent, resting upon stringers, which in their turn may be supported by any specified road-bed. Provided the road-bed is sufficiently secure, say of strong concrete, and the upper deposit is made sufficiently complete, the Stafford pavement cannot but compare favorably with other wooden pavements, and, for simplicity, is quite superior to the Nicolson. Both obviate certain objections in surface way, which pertain to the Belgian, in the wear and tear of vehicles and horses, and the noise or reverberation of wheels; but both are inferior to the asphaltic road in these respects, while the asphaltic has one great superiority valuable as a preventive of accident—to wit, the beating of the hoof of the horse is rendered very audible—audible above all other sounds—so as to be measurable by the ear in the matter of distance. This latter advantage can only be estimated by persons who have taken occasion to note the extent to which one falls into the habit of measuring the distance of a vehicle from any given crossing, by the ear; and one of the main liabilities to accident, occurring from wooden pavements, is the muffling or comparative muffling of the hoof-beat. In this respect, in fact, any form of concrete pavement possesses material advantages over either the stone block, which exaggerates the rumble of wheels and obscures the hoof-beat, or the wooden pavement, which reduces both in about equal proportions. In a word, a grave objection to the Nicolson pavement is the fact that in just one respect it is a trifle too noiseless for the safety of pedestrians in crossing, especially in these days when every driver seems to be possessed with the devil to run over somebody. Again, in case of extensive conflagration in any part of the city, the wooden pavement might prove a dangerous ally by ignition, an instance of which has recently occurred in Philadelphia. Neither of the wooden pavements above-named command the unqualified admiration of practical engineers as yet, though the test of use is the measure of merit in these matters, and neither has been in use here sufficiently long to warrant the expression of an opinion. In the great desideratum of simplicity; as well as in ease of repair, the Stafford seems to possess advantages over its elder in the field; but there is no likelihood that either will supersede the stone-block to any great extent. The coming pavement, in fact, from all indications included in the survey of the subject, is not to be found in any use of wooden blocks in any form or under any conditions.

If the Belgian (stone-block) is ever superseded—and it will be within the next twenty-years—that supersession will have been brought about by invention, in the way of practicable concretes. The asphaltic road in Paris has given an impulse to investigation in this direction which will not stop until some practicable substitute for the stone-block (Belgian) has been developed. The age of block-stone pavement is in its last quarter—to borrow a metaphor from the moon. The movement in favor of wooden structures is merely speculative and adventitious, and must of necessity prove exceedingly ephemeral in duration, exceedingly meteoric in its triumph over the fixed principles of practical engineering. Bubbles always burst, and need not, as a rule, be pricked by way of facilitating that operation; and that the mania for wooden pavements is merely speculative, no practical engineer can doubt. The wooden pavement question has, in fact, been exhaustively settled in the negative by English experiments during the past twenty years. Its merits are its noiselessness, its reduction of the mortality of horses, its reduction of the wear and tear of vehicles, and its effecting a utilization of the utmost percentage of draught force, and these are all merits to an equal degree of the asphaltic road—may be made merits of any concrete whatsoever. The increased mortality in horses occasioned by the Russ and Belgian and other stone pavements in this city is estimated at 3500 annually—an item of considerable importance in the discrimination between pavements for thoroughfares. As between the two typical structures, the Belgian and the Nicolson, from data already supplied, it may be estimated that, with the attrition of Broadway, the former would last fifteen years against a last of half that period in the case of the latter, if, indeed, the Nicolson can be regarded as equal to the necessities of Broadway at all. It is seen, therefore, that while the stone block (Belgian or Russ) is open to grave objections on the one hand, the wooden pavements (Nicolson and Stafford) are open to equally serious objections, on the other hand, on the score of lessened durability. The concrete pavement—the value of which has been happily settled in Paris—effects a union of the better qualities of both, without the objections appertaining to either, and, as the minds of engineers and inventors are already beginning to turn in this direction, nothing is hazarded in predicting that the ideal or coming pavement will be developed from the present crude concretes. The asphalt road, one triumph of concretion, the *béton Coignet*, another triumph in a direction of equal practical importance, the attempts at concrete from inexpensive material in this country, all point to the hypothesis that the solution of the long-mooted pavement problem is at hand, in the evolution of a concrete roadway combining the durability of the stone-block with the advantages of the wooden superstructure. Valuable hints as to the constitution of concretes may be found in the reports of Messrs. Beckwith on *béton Coignet*, and asphalt and bitumen as applied to the construction of streets and sidewalks in Paris; and, in the way of American invention, the constitution of the Fisk concrete pavement, under the Hairm-Burlew patent, may be studied. This pavement is composed of gravel, broken stone, cinders and coal ashes (free from all foreign substances), mixed in definite proportions with tar, rosin, and asphaltum. The road-bed properly prepared, the composition is spread on in layers of moderate thickness, successively rolled with heavy rollers for uniformity and compactness. These layers form a sufficiently strong roadway of from half to three-quarters of a foot in depth, and can be put down at an expense, per square foot, not exceeding the expense of the asphalt road as constructed in Paris. It remains for years and attrition to test the practical value of this concrete; but, in general, it may be remarked, that it is heartily and highly commended by thoughtful engineers as a step in the right direction. The sonorousness of the hoof-beat, as enabling the pedestrian to measure the imminence of passing vehicles, is an element of concretes over wooden pavements, illustrated in an eminent degree by the asphaltic road, the value of which as a preventive of accidents cannot be over-estimated. A pavement may be too noiseless as well as too noisy for immunity in this respect, and by all means let the capacity of the concrete be developed to the utmost. The Commissioners of the Park have also developed some excellent roadways in their admirable system of earth-roads upon a similar principle; though in relation to the Park, the problem has been less difficult of solution, no necessity existing to provide for the contingency of heavy traffic. In its capacity for the combination of all the qualities which experience has proved to be desirable in a roadway for large cities, the concrete must therefore be ranked as superior to either of its competitors, and as embodying in itself the germ of the coming pavement in this city, and the suggested reforms in the sewerage system having been carried out, attention may be directed to the production of an inexpensive concrete, analogous to the asphaltic road.

Discussion of the subject as it relates to the city would be incomplete without due consideration of the

TYPICAL HISTORICAL PAVEMENT,

based upon the Roman system and its susceptibility for improvement; for it is a fact that a large class of conservative engineers still look for the advent of the ideal pave in some modification of the stone-block on the concrete road-bed. The completion during the past week of the relay of the Broadway pave, at an expense of nearly $500,000, recalls the fact that no question exists as to the value of the substructure of concrete. The question is as to the superstructure. Large stone blocks on a road-bed of sand form the major part of the pavement of the city—the large block pave being less expensive than the small. On Broadway the unique feature introduced consists in splitting the blocks by a lateral fissure, leaving them in point of superficial appearance parallelograms a quarter of a foot in width, against a foot or thereabouts in length. This, by quadrupling the number of joints, affords a sure foothold for horses, especially as the blocks are laid transversely—the line of travel crossing the linear of the nave and surface at right angles with the length, with the effect to afford an average of four clinging points for the horseshoe in the new pave to one in the old. This decreases the liability to slip, really dividing it by four, and, with the concrete bed, fulfils the ideal of the old Roman pave. The want of elasticity is, however, in nowise obviated; the difficulty of traction is by no means lessened, the jar and volume of sound are not in the leastwise subtracted from. The sanitary purpose is met, and percolation is prevented; but no part of the $10,000,000 annual wear and tear of horses and vehicles is saved; and this is a matter to be considered in the pavement of a city. The important question is to settle upon the desideratum in the way of superstructure. Wood is too unreliable; the stone-block (trap) has superficial objections, due mostly to its want of elasticity. The problem has been solved in Paris by the superstructure of elastic asphaltic composition upon a strong road-bed of concrete; and the problem must be similarly solved here, before the full measure of the popular need in the construction of a perfect pavement can be rounded over. Before the necessity for repaving Broadway shall occur again, these questions will have been settled, and New-York may then hope to promenade a thoroughfare comparatively noiseless. A new concrete has just been tested at Prospect Park, Brooklyn, which promises well. It is composed of a first layer of gravel, a second layer of fine gravel and cement, and a third layer of fine gravel, sand and cement. Like Fiske's concrete, this pave is sufficiently elastic, but whether either will last long enough for economy remains to be seen. The true method of invention would seem to be to make *béton Coignet* the basis, and to this to superadd some fourth ingredient to develop the needed elasticity. Tar boiled to the point of elastic solidity, or asphaltum, which can be procured at twenty dollars per ton, currency, might be added in small proportions to the *béton*; and in this way, by experiment, a concrete might be developed equal in all respects to the asphaltic road, now so popular with engineers in Paris. The huge quarries of trap along the East River render the Russ pavement tolerably inexpensive; and hence, in order practically to supersede it, something must be produced which can be put at $2.50 or less per square yard, and as durable as the block-stone. An able and competent engineer estimates the loss in horses, extra wear of vehicles and extra horse-shoeing in the cities of the United States, occasioned by block-stone and cobble-stone pavements, at—

On horses	$15,000,000
On vehicles	20,000,000
On horse-shoeing	21,000,000
Total	$56,600,000

The province of invention in respect to pavements, therefore, is to save this vast amount by the substitution of a concrete upper structure as inexpensive and durable as the Belgian, and as elastic and easy as the wooden, which has failed in the respect of durability as well as over-expensiveness, and can never be generally adopted.—*New-York Herald.*

The Canon of the Colorado.

FOR several weeks past the press of the country has given place to a great deal of matter relative to the wonderful cañon of the Colorado River, which Colonel J. W. Powell and his little band of adventurous spirits have undertaken to make more fully known to the world. The following letters from the Colonel contain some very interesting details of his experience. We are indebted to the *Chicago Tribune* for the following:

ECHO PARK, MOUTH OF BEAR RIVER,
Friday, June 18, 1869.

On the 8th our boats entered the cañon of Lodore—a name suggested by one of the men. We soon came to rapids, over which the boats had to be taken with lines. We had a succession of these until noon. I must explain the plan of running these places. The light-boat, *Emma Dean*, with two good oarsmen and myself, explore them; then with a flag I signal the boat to advance, and guide them by signals around dangerous rocks. When we come to rapids filled with boulders I sometimes find it necessary to walk along the shore for examination. If it is thought possible to run, the light-boat proceeds. If not, the others are flagged to come on to the head of the dangerous place, and we let down with lines, or make a portage. At the foot of one of these runs, early in the afternoon, I found a place where it would be necessary to make a portage, and signalling the boats to come down, I walked along the bank to examine the ground for the portage, and left one of the men of my boat to signal the others to land at the right point. I soon saw one of the boats land all right, and felt no more care about them. But five minutes after I heard a shout, and looking round, saw one of the boats coming over the falls. Capt. Howland, of the *No Name*, had not seen the signal in time, and the swift current had carried him to the brink. I saw that his going over was inevitable, and turned to save the third boat. In two minutes more I saw that turn the point and head to shore, and so I went after the boat going over the falls. The first fall was not great, only two or three feet, and we had often run such, but below it continued to tumble down 20 or 30 feet more, in a channel filled with dangerous rocks that broke the waves into whirlpools and beat them into foam. I turned just to see the boat strike a rock and throw the men and cargo out. Still they clung to her sides and clambered in again and saved part of the oars, but she was full of water, and they could not manage her. Still down the river they went, 200 or 300 yards, to another rocky rapid just as bad, and the boat struck again amidships and was dashed to pieces. The men were thrown into the river and carried beyond my sight. Very soon I turned the point, and could see a man's head above the waters seemingly washed about by a whirlpool below a rock. This was Frank Goodman clinging to the rock, with a grip on which life depended. As I came opposite I saw Howland trying to go to his aid from the island. He finally got near enough to Frank to reach him the end of a pole, and letting go the rock he grasped it and was pulled out. Seneca Howland, the Captain's brother, was washed further down the island on to some rocks, and managed to get on shore in safety, excepting some bad bruises. This seemed a long time, but it was quickly done. And now the three men were on the island, with a dangerous river on each side and falls below. The *Emma Dean* was soon got down, and Summer, one of the men of my boat, started with it for the island. Right skilfully he plied his oars, and a few strokes set him at the proper point, and back he brought his cargo of men. We were as glad to shake hands with them as if they had been on a voyage round the world and wrecked on a distant coast. On the night of the 12th we camped in a beautiful grove in box-elders on the left bank, and here we remained two days to dry our rations, which were in a spoiling condition. We found the wreck of a boat near our own, that had been carried above high-water mark, and with it the lid of a bake-oven, an old tin plate, and other things, showing that some one else had been wrecked there and camped in the cañon after the disaster. This, I think, confirms the story of an attempt to run the cañon, some years ago, mentioned before. On the 14th, Howland and I climbed the walls of the cañon, on the west side, to the altitude of 2000 feet. On looking over to the west we saw a park five or six miles wide and 25 or 30 long. The cliff formed a wall between the cañon and the park, for it was 800 feet down the west side to the valley. A creek came winding down the park 1200 feet above the river, and, cutting the wall by a cañon, it at last plunged 1000 feet, by a broken cascade, into the river below. The day after, while we made another portage, a peak on the east side was climbed by two of the men and found to be 2700 feet high. On each side of the river, at this point, a vast amphitheatre has been cut out, with deep, dark alcoves and massive buttresses, and in these alcoves grow beautiful mosses and ferns. Another day was spent on the waves,

among the rocks, and we came down to Alcove Creek, and made an early halt for the night. The camp was made by a group of cedars on one side, and a mass of dead willows on the other. A whirlwind came and scattered the fire among the dead willows and cedar spray, and soon there was a conflagration. The men rushed for the boats, leaving all behind that they could carry at first. Even then, they got their clothes burned and hair singed, and Bradley got his ear scorched. The cook filled his arms with the mess-kit, and, jumping on to the boat, stumbled and threw it overboard and his load was lost. Our plates are gone. There are yet some tin cups, basins, and camp-kettles, and we do just as well as ever. When on the boats the men had to cut loose, or the overhanging willows would have set the fleet on fire, and loose on the stream they had to go down, for they were just at the head of rapids that carried them nearly a mile. This had been a chapter of disasters and toils, but the cañon of Lodore was not devoid of scenic interest. It was grand beyond the power of pen to tell. Its waters roared unceasingly from the hour we entered it until we landed here. No quiet in all that time; but its walls and cliffs, its peaks and crags, the amphitheatres and alcoves told a story that I hear yet and shall hear of beauty and of grandeur.

SUNDAY, June 20.—At the point where the Bear, or, with greater correctness, the Yampa River enters the Green, the river runs along a rock about 700 feet high and a mile long, then turns sharply around to the right and runs back parallel to its former course for another mile, with the opposite sides of this long, narrow rock for its bank. On the east side of the river, opposite the rock and below the Yampa, is a little park just large enough for a farm. The river has worn out hollow domes in this sandstone rock, and standing opposite, your words are repeated with a strange clearness, but softened, mellow tone. Conversation in a loud key is transformed into magical music. You can hardly believe that it is the echo of your own voice. In some places two or three echoes come back; in others, the echoes themselves are repeated, passing forth and back across the river, for there is another rock making the eastern wall of the little park. To hear these echoes well, you must shout. Some thought they could count ten or twelve echoes. To me they seemed to rapidly vanish in multiplicity, auditory perspective, or per-auditory, like the telegraph-poles on an outstretched prairie. I observed this same phenomenon once before among the cliffs near Long's Peak, and was delighted to meet with it again.

CAMP AT MOUTH OF WINTER RIVER,
ISLAND PARK, June 23, 1869.

When we left Echo Park on the 21st, we soon ran into a cañon, very narrow, with high vertical walls. Here and there huge rocks jutted into the water from the walls, and the cañon made frequent and sharp curves. The waters of the Green are greatly increased since the Yampa came in, as that has more water than the Green above. All this volume of water, confined as it is in a narrow channel, is set eddying and spinning by the projecting rocks and points, and curves into whirlpools, and the waters waltz their way through the cañon, making their own rippling, rushing, roaring music. It was a difficult task to get our boats through here, as the whirlpools would set them spinning about the cañon, and we found it impossible to keep them headed down stream. At first this caused us great alarm, but we soon found that there was no danger, and that there was a motion of translation down the river to which this whirling was but an adjunct. It was the merry mood of the river to dance through this deep, narrow, dark gorge, and right gayly did we join in the dance. Soon our revel was interrupted by the view of a cataract, and its roaring command was heeded with all our power at the oars as we pulled against the whirling current. The *Emma Dean* was landed against a rock, about 50 feet above the brink of the cataract. The boats following obeyed the signal to land. The *Maid of the Cañon* was pulled to the left wall, where the cliff overhangs the water, and where, by constant rowing, they could hold her against the rock. The *Sister* was pulled into an alcove on the right where an eddy was in a dance, and in this she joined. I found that the portage could be best made off the right bank. The little boat was on the left, and too near the falls to be taken across, but we thought it possible to take her down on the left. The *Maid of the Cañon* was under the cliff, out of sight. The roaring of the cataract would drown any human voice, and I must get them word what to do. By much search I found a way along the cliff to a point just over where the boat lay, and, by shouting loud and slow, made them understand. The portage was made before dinner. Below the falls the cañon opens out, there is more or less space between the river and the walls, which is often covered by cotton-wood and boulders, but the stream, though wide, is rapid, and rolls at a fearful rate among the rocks. But we proceeded with great caution, and ran the large boats altogether by the flag. We camp at night at the mouth of a small creek, which affords a good supper and breakfast of trout, and proceed again by stages of a half mile to a mile in length. One, two, three, four miles we go, rearing and plunging with the waves, and shoot out into a beautiful park filled with islands—Island Park, we call it, and the cañon above, Whirlpool Cañon.

J. W. POWELL.

THE number of works sent in for the Brussels Fine Art Exhibition is so much larger than was anticipated, that it has been found necessary to construct a third supplemental building, having an area equal to that of the two annexes already erected.

Notes on Engineering Law.

BY C. E. SMITH, COUNSELLOR AT LAW AND ENGINEER.]

IT has been suggested to the writer that a concise statement of the various laws affecting engineering works, and the rights and liabilities of those engaged upon them, would be not only useful but acceptable to the engineering profession. There are certainly many reasons why this should be so, and it is in the hope of partially supplying the want thus apparently indicated, that the present series of articles has been undertaken.

That all men should possess at least a general knowledge of the law by which they are governed, would seem to need no argument, were it not for the fact that many men actually lack it, and do not appear to realize its importance to them. A complete knowledge of the details of the law is desirable only for the professional student; for any other, it is enough to know the leading features and the details which more immediately concern his particular business. It is, therefore proposed here to lay before the reader some of those points which are most likely to present themselves in engineering practice. These will be: Of inland streams, natural and artificial, with reference to boundaries and to the drainage and flowing of land; of the right of support from adjoining land for earth or structures; of the right of way for lines of communication.

Considered simply from an economic point of view, there must come occasions to every man when a knowledge of some simple point of law might save him both trouble and expense. Considered from the higher ground of the relations which each one bears to society, the subject is well disposed of by Blackstone, in the introduction to his Commentaries: "As, therefore, every subject is interested in the preservation of the laws, it is incumbent upon every man to be acquainted with those at least with which he is immediately concerned, lest he incur the censure, as well as inconvenience, of living in society without knowing the obligations which it lays him under. . . . They cannot, in any scene of life, discharge properly their duty, either to the public or themselves, without some degree of knowledge in the laws." And again, speaking of the gentlemen of independent estates and fortunes, he says that even to suppose them ignorant in this branch of learning is treated by Mr. Locke as a strange absurdity. Certainly there can be no doubt that all men whose business brings them to deal sometimes with subjects involving legal questions, should be able correctly to answer those questions, and engineers belong to this class. An engineer may be called to determine whether the position or height of a dam will subject his employers to a lawsuit; whether a certain plan of drainage can be carried on without interfering with the rights of neighboring owners; whether he will be justified in disregarding the warnings or threats of a man who objects to the location of a road; and, in many cases, may find, in his knowledge of law, a solution to difficulties of which otherwise he would not have thought. And thus, although the absolute necessity of acquiring this information cannot be urged, its general importance and its great convenience furnish abundant reason for giving it attention.

It is indeed strange that any person should feel an indifference for so valuable and elevating a study; that any one should think dry and uninteresting that study which follows the social progress of man from the foundation of the world, and is, of all others, the one most closely identified with his public welfare and his domestic relations. And it is still more strange that any one should be willing to neglect such an element of strength. Protected by this, one need fear no imposition; without it, he is at the mercy of all who have the power he lacks, and are unscrupulous enough to use it wrongly.

When such indifference exists, it is to be found chiefly among those not engaged in commerce, and seldom brought into contact with the ways of trade. And the cause of it may be partly that the refinements and intricacies of the law, finding expression only through lengthy papers, voluminous books, and ingenious arguments, appear subtle and dangerous to the man who deals with material forces, and whose pursuits tend to make him free and social in his intercourse with others, rather than calculating and shrewd. And, in part, it is no doubt that lawyers themselves have done much to excite distrust among those who are ignorant of the law; that, having in their hands a great power for good or for evil, they have often used it for evil. Our somewhat lax system of admission to the bar, and our very unfortunate one of an elective judiciary—both of them the outgrowth of exaggerated ideas of Democracy—have produced lawyers whose chief aim is plunder, and judges whose highest guide is self-interest. Far different this from the grand ideas of the Roman and English systems, on which our law is founded, which supposed a counsellor to be one of the first men of the land, pleading for his clients with no other reward than their gratitude and his own approving conscience, a judge to hold his position because of his purity and learning. It may be that these ideals are undesirable in a practical age, but justice is desirable in any age, and we should not permit our tenderness for the right of Democratic equality to blind us to the right of protection for our property, our liberties, and our honor.

In considering these things, however, we must not ourselves be led astray by just indignation from an impartial judgment. The imperfections we find so grievous are but incidental blots upon a scheme, the simple beauty of which they scarcely mar. They are faults of detail only, not of plan. We are like a man who owns a homestead in a lovely valley, and who, standing in his field, can see many unsightly rocks and hummocks which he should modify or remove; but the stranger, who beholds our stable government, just laws, and free institutions, regards them as one upon the hill-top would regard the home in the valley, its defects being lost sight of in the harmony of its general outlines.

The common law of England has been described as the application of the dictates of natural justice and cultivated reason to particular cases. It is a collection of unwritten maxims and customs, which are supposed to have existed for so long that the memory of man runneth not to the contrary, and therefore to have been always known, and to be merely declared from time to time by the judges. Thus, although a decision may in fact be entirely new, it is considered that its principle has always been recognized, but has hitherto remained unannounced because uncalled for. And however subtle this fiction may seem to be, it is logical; for otherwise we should ascribe to the judges the power of making that law which they have but to administer. Having been once declared, the decision remains an evidence of the law until overruled, when it is assumed, not that the law has been changed by the higher court, but that it is better understood. The reports of decided cases are therefore our highest authorities.

The Roman or civil law was first brought into England about the time of King Stephen, by the Norman clergy, to whom the common law was distasteful, not only because it was unfamiliar, but perhaps also because it was Saxon. It met with great opposition, however, from the people, and was never established in any but the ecclesiastical courts. But since the office of Chancellor was always filled by an ecclesiastic, it came to pass afterward that when the Chancellor began to assume juridicial powers, and to hold courts of conscience or equity, the decisions therein were always governed by the civil or canon law. This was the origin of the Court of Chancery. And by this means many of the principles of the civil law became incorporated with the common law. For the Court of Chancery is no longer guided by the civil law, as such, but its decrees form a part of the common law of the land, although there is quite a distinction between them and the decisions of the other courts. These confine themselves to the original common law remedies, or to those given by statute, while chancery affords only those called equitable. In many of the United States, however—perhaps in most of them—the Court of Chancery no longer exists as a separate tribunal, and its functions are exercised by the other courts.

What is called the municipal law of a country, is defined as a rule of civil conduct, prescribed by the supreme power of the state; and it is composed of common and statute law. And if to apply this definition to the common or unwritten law seems inaccurate, it may be answered that the immemorial customs of a people, on which alone their form of government rests, are as much entitled to be called the supreme power of the state, and to prescribe rules, as is the legislature itself. In this country, we have not only the municipal law of each State, but also that of the United States.

That of the United States may be considered as entirely statutory, for the General Government derives all of its power from concessions made by the several colonies at the time of their adoption of the Constitution, and its courts have no further jurisdiction than is given by the Constitution and by the Acts of Congress. In the construction of these Acts, however, and in all the jurisprudence of the federal courts, the common law must be followed. In regard to the powers delegated by the States, Chancellor Kent quotes as follows, saying that it must be received as a correct and conclusive exposition of powers of the General Government. "It was observed in the *Federalist*, that the State governments would clearly retain all those rights of sovereignity which they had before the adoption of the Constitution of the United States, and which were not by that Constitution exclusively delegated to the Union. The alienation of State power or sovereignty would only exist in three cases: where the Constitution in express terms granted an exclusive authority to the Union; where it granted in one instance an authority to the Union, and in another prohibited the States from exercising the like authority; and where it granted an authority to the Union to which a similar authority in the States would be absolutely and totally contradictory and repugnant."

The laws of the several States have a much more important bearing on all questions of private interest than have those of the United States, for they take almost exclusive cognizance of the rights and liabilities arising between man and man. The common law is recognized in all the States of the Union except Louisiana, and in most of them it has been formally adopted by their Constitution or statutes. In general, such parts of the common law of England, together with such English or colonial statutes, as formed the law of any particular colony at the time of the Revolution, is taken as the common law of that State, so far as applicable to its changed relations. And the same is substantially true of the new States, with the exception of course of colonial statutes. In the State of Louisiana the maxims of the civil law take the place of those of the English law, because, Louisiana having been a French colony, the observance of the civil law has been with them an immemorial custom. The statutes of any State must conform to the Constitution of the State, and also to that of the United States, and in so far as they are repugnant to either they are unconstitutional and void.

Such is a meagre sketch of the frame of that law which has won for our country the distinction of having the best government that the world has ever seen. In it are gathered the excellencies of the two most perfect systems that have ever been. Its foundations rise from the depths of the ages, and were built of the wisdom of generations.

[To be continued.]

MINING SUMMARY.

Nevada.

PROCEEDS OF THE WHITE PINE MINES FOR THE QUARTER ENDING JUNE 30TH.

THE *Inland Empire*, August 8th, says: "We publish below the assessment-roll of the gross proceeds of the mines of the District, as returned by the County Assessor, for the quarter ending June 30th. As will be seen, the total amount of ore milled is but little in excess of 4000 tons, while the aggregate bullion yield foots up $412,814.19, or $98.82 per ton. The result exhibits a gratifying state of affairs, all things considered. It is true the bullion product is not quite so large as could be desired, but that it is a good showing, considering the number of stamps in operation for the three months preceding the 30th of June, is also true. During the whole of April and the greater part of May, the actual bullion-producing capacity of the district was limited to 30 stamps, all told, while for no part of the quarter were there over 65 in active operation. But what we lack in the quantity of ore reduced is satisfactorily made up in the unprecedented yield. Returns have been made from 34 mines, scattered over an extent of country six miles in length by three in width—from Bullion Hill to the Southern base of Treasure Mountain. Of the ore worked from these 34 mines, as will be observed by the table which follows, the lowest average yield is a fraction over $30 per ton, the highest $4964.36; while the grand average of all the ore reduced for the quarter in the district is, as already stated above, $98.82 per ton. Following is a complete list of the mines having made returns to the Assessor, the number of tons milled, and the amount of bullion produced:

Name of Mine.	*Tons.*	*Value.*
Autumn,	115.1049	$19,333.08
Alturas,	60.0881	11,849.90
Angustora,	6.0915	2,926.60
Aurora South,	343.0382	22,589.50
Addington,	7.1837	418.04
Aurora Consolidated,	239.0953	10,678.70
Charles and Theresa,	10.0977	663.66
Copper-Silver Glance,	7.1850	565.85
Charter Oak,	4.0064	233.08
Comstock,	4.1659	354.81
Consolidated Chloride,	931.0751	88,132.01
California,	23.1696	3,177.38
Dell,	5.1000	165.00
Derby,	75.0280	4,720.43
Eclipse Consolidated,	14.0149	4,819.31
Eberhardt,	744.0000	110,712.00
Original Hidden Treasure,	428.1091	34,512.78
Hearst,	19.0585	1,796.29
Hidden Treasure, first ex.,	19.1721	2,189.42
Highland Chief,	1.1064	146.31
Industry,	175.0046	14,688.56
Inimportancy,	2.0593	217.74
Keystone,	64.0533	12,070.11
Nash and Melleno,	.1160	83.56
Pocotillo,	7.0032	213.06
Post Hole,	215.0000	27,907.00
Rattler,	105.0785	2,690.00
Sage Bush,	17.1370	784.12
Steptoe,	15.1910	478.65
Summit and Nevada,	495.0000	32,810.20
Thunderbolt,	3.0299	132.78
Virginia,	6.1814	498.10
Willard,	2.0015	9,928.73
Zubrick,	.1972	197.00
Total,	4,174.0064	$412,814.19

"Under the law, $18 per ton of the gross proceeds of the mines is exempt from taxation. This amount deducted, the 3¼ per cent tax on the remainder will return $11,093.65, which is the amount of revenue accruing from the mining tax in this county for the quarter ending June 30th."

THE COMSTOCK AND "OUTSIDE" MINES.

The Virginia City correspondent of the San Francisco *Herald*, August 8th, writes as follows:

"Of all the mines in this section, outside of the Comstock ledge, the Occidental has thus far proven itself to be the best and most reliable. The ore in it is all low grade, but very regular, extending in an unbroken sheet from the summit of the hill 600 feet down to the lowest working level or tunnel. Winzes have been sunk over 200 feet below that, and all the way in ore of an improved quality. Indeed, the ore constantly is found richer as depth is attained. A tunnel is being run from away down on the hillside, which will work the ledge 400 feet deeper than the present working level. It is already over 1000 feet in length, and, judging from the softer and more favorable character of the rock, as well as surveys, the tunnel must be near the ledge. A fine stream of water is developed by this tunnel, which will be made available for mill purposes. The pay-ore of the vein varies from six to twelve feet in width, and there is plenty of it in sight to last for many a long year to come; besides which, an immense extension of it has been recently developed by the 600-foot, or lowest working level, being run 400 feet further north, beyond the old workings. The mine looks well throughout, and the company finances are healthy.

"The mines along the Comstock were never worked to better advantage, as far as this side of the Divide is concerned. Those at the Gold Hill end have a dampener thrown on them by the continued disability of the Crown Point, Kentuck, and Yellow Jacket, on account of the fire which still burns within their depths, yet they, in the course of a few months, will recover even from that terrible blow. North of the Gould & Curry, the ledge may be set down as dead and expensive property, except in the case of the Sierra Nevada mine, which is one of the best paying of any on the whole ledge, and is worked at the least cost. It is a valuable and well-managed mine.

"The second clean-up of the Sierra Nevada for last month yielded $11,000, and the mill is regularly at work again as usual on another run of superior ore. The yield for the present month will be even better than that of last month. The first clean-up will be made on the 16th. The huge deposit of ore does not decrease, but, on the contrary, increases in size as working development progresses. It will take many years to work it out. The finances of the company and the excellent yield warrant another dividend soon.

"The Gould & Curry still yields well from the old upper workings, about forty tons per day of $45 ore being produced, with good prospects for a still better yield shortly. Good progress is being made with the drift east at the Seventh station, near the bottom of the shaft.

"The Savage is in rather a quiescent state at present. It yields considerable good ore, but the developments at the lower levels are not satisfactory. Good bodies of ore are hoped for in deeper sinkings.

"Hale & Norcross is also down, owing to less yield of good ore of late. The repairs to the shaft will be completed in three or four weeks, when, with better facilities, a better yield will be the consequence. There is one splendid body of rich ore at the lowest levels, and another in the old upper workings, which assays $40 per ton.

"The recent burning of the new Chollar-Potosi hoisting-works did not impede the working of that mine at all or injure it; on the contrary, it has yielded better ever since, and more and richer ore is developed in the main workings. A dividend of $2 per share, aggregating $56,000, was declared last Thursday.

"The water in the north shaft of the Yellow Jacket is reduced to about seventy feet. It will take a month yet to get it all out, and also the thirty feet of mud and *débris* at the bottom of the shaft. It will be at least two months before any ore will be taken from the north mine through this shaft. The air in the north mine is tolerably good, and it is yielding the usual amount of ore.

"Satisfactory developments are being made in the new opening into the lower part of the Kentuck mine, through the 900-foot level of the Yellow Jacket. The upper levels yield as usual. Another assessment of $10 per share was levied last Thursday.

"No good ore developments are yet made in the 1000-foot level of the Crown Point, although explorations are nearing the east wall. Unless they find something at that Point, the chances are slim at the 1100-foot level below, which is now near or into the west wall of the ledge. The upper levels in the west ledge are being cleaned out, in order to get at the large amounts of low-grade ore known to exist there. An assessment of $5 per share, aggregating $60,000, was levied day before yesterday.

"In the Belcher mine, a raise 130 feet in length was completed day before yesterday, from the 850 to the 730-foot level, furnishing an excellent circulation of air in that part of the mine. The proposed drift northeast, to connect with the 900-foot level of the Crown Point, was commenced yesterday.

"The Overman yields twenty-five or thirty tons of $20 ore per day, and a very good showing of ore exists at the fourth level, improving in both quantity and quality. The prospecting going on in other parts of the mine develops nothing important in the way of more good ore just at present, although there are prospects of something better soon."

Colorado.

MINING IN PARK, LAKE, AND SUMMIT COUNTIES.

MR. W. R. THOMAS, the capable mining editor of the Denver *News*, contributes the following notes on mining in these counties of Colorado:

"Park, Lake, and Summit Counties are the three gulch-mining counties of the Territory. Although they contain rich lodes, both of gold and silver, their principal, and in fact almost entire, gold production has been from the gulches. These have been worked since 1860 and 1861, and are far from being worked out. The early miners only skimmed the surface, taking in most instances the best pay, but leaving in nearly every case enough to pay handsomely for ground sluicing. With a reduction of wages and expenses, much more ground can be worked, for there is almost no limit to the amount of land, which in these counties will pay from $3 to $10 per day.

"In and about Fairplay during the present season, mining operations are brisker than they were last year. More men are at work, but the mines are not yielding so much per day to the man, so that while the production will not be less, I do not think it will be very largely increased. The Chicago Company, H. S. Hitchcock, Superintendent, are working ten men in the bank diggings, and taking out good pay, as I am told. The amount per day to the man Mr. Hitchcock keeps to himself. In the gulch Mr. Lenwald is working three men, and taking out $5 per day to the man; Messrs. Rippey & Co., three men, and taking out $10 per day to the man; Mr. Burr, three men, and taking out $10 per day to the man; Mr. Anderson, six men, and taking out $7 per day to the man; Mr. Moore, two men, and taking out $7 per day to the man. In Beaver Creek work has ceased for the season, on account of a lack of water. To work this gulch successfully, water will have to be brought from the Platte, which will involve a large expenditure of money; but I am convinced it would pay, as the gulch has the reputation of being rich. On Four Mile, Mr. Lowe is working a number of men, and taking out fair pay. His mine is one of the best situated in the county, and is being very finely developed. Sacramento Gulch is being worked by Messrs. McLaughlin & Hall, with some four or five men, who are taking out good pay. At the mouth of Mosquito Creek, Mills & Co. are opening new ground, which prospects well, and from which they hope to take good pay next year. Dan McLaughlin has struck a fine thing on his ranch, and is opening ground which is now yielding between $14 and $15 per day to the man. The gold is as fine as any I ever saw. On Tarryall but little work is being done, but the gulch is paying fairly for those working. I know of no gulch which would pay better to flume. It is exceedingly rich, and to the capitalists who will open and work it in a systematic manner it will yield large returns.

"At Buckskin, Messrs Gross & Co. are just beginning work in the gulch, while a number of arastras have been running all the season. Mr. Ware is running three, and Mr. Bergh two, the former on ore from the old Phillips lode, and the latter on ore from the E. C. L. lode. They are taking out about $12 per day to the arastra. At Musquito six arastras are running, mostly on ore from the Orphan Boy lode. Newlin & Brother have three, Mr. Monahan two, and the name of the other party I did not learn. The arastras are yielding an average of about $12 per day each. At Montgomery, Mr. Fay is running an arastra, and Messrs. Myers & Plummer are opening gulch diggings in the creek, from which they have a prospect of large pay.

"The Colorado G. & S. M. Company are still developing their Excelsior lode above Buckskin, under the able direction of Mr. Morse, but are making no attempts to work their ores.

"This, I believe, constitutes a fair *resumé* of mining operations in Park county. No County in Colorado offers better inducements for investment, or will pay fairer returns for capital properly expended and labor well directed. Those who are enterprising and energetic need not labor for nothing. The county is rich in mineral wealth, and needs only development to render its bullion product as certain as it will be large."

CLEAR CREEK ITEMS.

THE Central City *Herald*, August 11th, has these items of news:

"The vein of ore recently struck in the Baltimore tunnel, Brown Mountain, is from four to six inches wide, and assays $350 per ton.

"The shaft on the California lode, Sherman Mountain, is now 35 feet deep. The mineral vein is about eight inches wide and very rich.

"The Baker Company will be ready to start three Bruckner cylinders in the course of two weeks. The capacity of the mill will be about twelve tons per day.

"Huepedon & Co. are putting up another cylinder, and will have it running at the earliest possible moment. They have been running on Equator ore for a few weeks past. Last week they made a run on Belmont ore. The Equator Company are putting up an engine for hoisting ore from the mine.

"Bruckner is now at the Moreno mines as agent for Raymond, collecting statistics.

"Professor Dibbin will have his mill ready to run in the course of two weeks. He is going to run the ore raw in pans—will do it cheap, and the miners are in high hopes that he will do good work for Argentine District. He will put up a Bruckner cylinder also."

THE TERRIBLE MINE—THE BURLEIGH DRILL.

FROM the same source we glean an account of the Terrible Mine, one of the most prominent and promising in the Territory: "This mine has been worked during the past fifteen months, yielding 400 tons of first-class and 1400 tons of second-class ore; 141 tons of first-class ore has been treated at Newark, N. J., which averaged $560 in coin; counting the premium on silver at 30 per cent, this would make it $728 currency per ton. The mining and transportation to Georgetown cost $30; transportation to Newark, $64; and treatment, $50; giving a total expense of mining transportation and treatment of $144, which leaves a profit of $584 per ton, or $82,344 on the lot of 141 tons of first-class ore. We have no definite report of what the ore treated at Georgetown has produced, but suppose it would at least pay for the mining and hauling of all the ore to Georgetown. There are now six levels in the mine, in the aggregate 570 feet long. The shaft is 185 feet deep. Work is at present being done in the levels and in the cross tunnel, which is being driven by the Burleigh drill at the rate of nine feet per week. It is at present 110 feet from the entrance, and there is a distance of 190 feet yet to go before reaching the vein, which the owners hope to strike about the middle of March next. The tunnel is seven feet wide by seven feet high, and will strike the vein at a depth of 280 feet from the surface. Only one Burleigh drill is used. It is working admirably, and giving entire satisfaction. The machine is worked by compressed air. It would seem from the experience of Messrs. Crow & Clark that it is more economical to use only one drill in a tunnel of this size. Mr. Burleigh is using four; but his progress has not been in proportion to the number of his drills. The difference, however, may be accounted for by other causes, such as harder rock, or more of it to break.

"The figures which are given above do not show the full and complete history of the working of this mine, but they approximate the truth near enough to give a good idea of what the Terrible Mine has produced. The complete figures would show a much larger profit on the working of the mine from the day it passed into the hands of its present owners up to this time. There is every reason to expect that the profits of the next fifteen months will be much greater than what has already been realized, because the ore can be broken at less expense, and the cost of transportation is diminishing constantly."

Saxony.

THE TERRIBLE COLLIERY-ACCIDENT IN SAXONY—OVER FOUR HUNDRED LIVES LOST.

A CORRESPONDENT of a London journal, writing from Dresden on August 5th, gives the following particulars of the dreadful colliery accident near that city: Early on Monday morning last intelligence was received here that a short distance from this city upward of four hundred men had fallen victims to a terrible colliery accident. At first it was hoped that the numbers were considerably exaggerated, but it is now nearly certain that the figures will prove even greater, four hundred and twenty or more being absent from the roll-call on Tuesday. The following are the details, as exact as it is possible to arrive at them during the consternation caused by this sad calamity. On Monday morning, at 5 A.M., a shock like that of an earthquake alarmed the neighborhood of Potschappel, a pretty little village somewhat resembling Matlock, in Derbyshire, situated about five miles from here among the hills of Plauen; and it was immediately surmised that an explosion had occurred in one of the great mines belonging to Baron Burg. Two men were blown out of the shaft by the force of the explosion, but in such fragments as to be altogether unrecognizable. The gas ignited the coal, and for some hours the pit was in flames. At 1 P.M., a man volunteered to descend, notwithstanding several minor shocks had occurred; but when the cage returned to the bank he, too, was gone, nor could he be rescued before 3 P.M. the following day (Tuesday), when he was found insensible and apparently dead some yards from the bottom of the shaft. He has since recovered, and states that when he first descended he distinctly heard cries for help, but this is generally considered very improbable. Up to Tuesday night only fifteen bodies were recovered. Some were burned to cinders, others singed black with the explosion—the scene around being past description. The crowds of poor women, some of them having lost three or four of their family, standing in the wildest grief round the pit, hoping against hope that their loved ones might be rescued alive. The heart-breaking sobs of the children, and the sterner grief of the men, made the scene agonizing in the extreme.

On Wednesday morning I went to the spot, and found that altogether fifty bodies had been recovered and were placed in a neighboring shed for recognition. En route thither I met cart after cart carrying away one or two coffins, and two large vans loaded with empty shells for the reception of the bodies as they were brought to bank. I saw altogether thirty corpses, and their state defies description. Here, a long, shapeless, black mass, which the miners told you was one of their comrades, but in which it was difficult to recognize the slightest likeness to humanity. Here one had his head blown off, there one his arm, one lay on his bed of leaves with his face split open, another as though much bruised by the coal falling on him. The sad work of recognition was proceeded with with as much dispatch as possible, and the bodies were then placed in their shells and their names written

on the lid in chalk. A shriek in yon corner would tell of a mother recognizing her son, or a wife her husband, lying among the long row of the unsightly corpses, while the plaintive wail throughout told of a far wider-spread grief. I conversed with one of the miners who had just come up, and he said the labor of recovery must be very slow (about one body every three hours), as the sides of the mine had fallen in, and they had to work the coal away. In most cases they found the men lying under the sides of the mine, some buried in coal, others on whom the coal had fallen, and then burned up. One was found near the mouth of the farthest shaft, hardly injured at all; and as he lay in the shed he formed a striking contrast to his companions, being extremely white, and well-dressed. The appearance of the few recovered seems to indicate that most of them must have been killed by suffocation, being much swollen in the face, and nearly all bleeding considerably at the nose, only a few (at present) being much burned with the explosion. Two men work at a time at each end, the two shafts being quite three hundred yards separated, but they ceased work at the end nearest the village on Tuesday. Each man as he descends is asked whether he is perfectly willing to go down, and at first, Mass was held for those who were to descend at the top of the pit. The depth is three hundred and thirty French metres, and the colliery is situated at the top of a considerable elevation, commanding a splendid view of Dresden and the valley of the Elbe. The trains daily pour hundreds out at the hitherto quiet little station, and the pit and its environs are guarded by a company of soldiers and police-agents. The King it is said has given five hundred thalers (about £75) toward the relief of the destitute poor. It seems very improvident, but the miners here only use the open lamp, so that they are altogether unprotected from the effects of gas, etc. They also descended when searching for the bodies smoking segars; but I heard the doctors had told them to do so on account of the horrible smell below. Among the many distressing cases one hears of, one alone I will mention, that of a poor girl travelling in the same carriage with a friend of mine, who had lost her father, two brothers, and a step-brother, her whole family being swept off in one day. One should be thankful this accident happened when it did, if accident there must needs have been, for the great Fogelwese, the annual feast of the Saxons, held at Dresden night and day for one week, had attracted many others who would otherwise have met the same sad fate of their fellows. There is great difficulty in obtaining details, but this is unavoidable, owing to the rigor with which the soldiers are bound to keep the public back in order not to interfere with the progress of the search. I was fortunate enough to be there early, and the soldiers passed me through, which enabled me to take a minute view of every thing; but the scene is one so sad, so heart-rendering, so agonizing, with the plain, out-spoken anguish of the bereaved around you, that he must be a hard-hearted man indeed who can survey the catastrophe unmoved.

Michigan.

THE COPPER MINES—THE PHŒNIX MASS PRODUCTS, ETC.

A CORRESPONDENT of *The Mining Journal* writes that the average dimensions of the "Great Mass," at the Phœnix mine, of which mention was made in these columns a week or two ago, are as follows:

"Length, 65 feet; height, 32 feet; thickness, about two feet; giving a total of 4160 cubic feet. The purity of the mass is estimated at 65 per cent. Thus a cubic foot of 65 per cent mineral would weigh about 400 pounds, and 4160 cubic feet would weigh 1,164,000 pounds, or 832 tons; making this by far the largest mass of copper ever found on Lake Superior or in the world."

The following July products have been received:

Knowlton mine, barrel and stamp,	9 tons,	1488 lb
Evergreen bluff mine, mass, barrel, and stamp,	16 tons,	594 lb
Pewabic mine, barrel and stamp,	50 tons,	131 lb
Franklin mine, barrel and stamp,	75 tons,	535 lb
Quincy mine—June product, stamp,	130 tons,	1550 lb
Ridge mine, 19 masses,		8,738 lb
" " 30 barrels,		28,166 lb
Total,		36,904 lb

Or 18 tons 904 lb.

Speaking of the alterations in progress in the smelting works the same paper says:

"The four cigar-shaped cupolas, for slag melting—having the water-jackets on the outside—are to be superseded by three funnel-shaped cupolas, having McKenzie's patent water-jacket on the inside. The new ones are already in place, and will be ready for use soon. They are twenty-six feet in length, ten feet in diameter at the base, and 7 feet 8 inches at the top, weighing about 4800 pounds each."

The Ontonagon *Miner*, August 14th, has these mining items:

"The Flint Steel River Mine is making all due arrangements for constructing their new stamp-mill. The frame work is being prepared, and will be ready for the machinery on its arrival.

"We are glad to learn that much better results are being attained at the Minnesota mine than was anticipated. The works are mostly prosecuted on the South bluff. In extending the adit on the Minnesota property there was about eight feet in distance driven. From this, eight hundred pounds of small mass and barrel copper were taken, thus showing, in a marked degree, the extreme richness of the lode the Company are engaged in working."

COPPER IN THE LAKE SUPERIOR IRON MINE.

THE Marquette *Mining Journal* says:

"Some excitement has resulted from the reported discovery of a nugget of copper directly in the hard red ore of the Lake Superior mine. The nugget certainly was found somewhere; it is a fine fellow of 15¼ pounds, perfectly pure and unmixed with stones or a gangue of any kind. But whether it was actually nestling in the very heart of the iron or not, it would be hard to decide. Probability says 'no,' and testimony 'yes.' It is one of those facts which, however stated, whether denied or affirmed, must be followed by a point of interrogation or mark of doubt.

"Copper, in the form of oxide or some salt, is very common in the Lake Superior mine. It forms sometimes a green film on the exposed surfaces and in the seams of the hard ore, and also of the so-called hematite. Again, it appears as an invisible but still recognizable constituent of the ore. The other evening our blow-pipe disclosed its presence in a green clay, quite common hereabouts as a companion of iron ore.

"These amounts of copper, though small, are not unlikely to affect the character of the iron; in what way, however, it is difficult to say. Karsten, to whom all the modern authorities turn on this matter, asserts, that in certain quantities copper makes iron red-short. This would be an interesting subject of research and discussion."

Montana.

ELK CREEK.

THE *New Northwest*, a new paper recently started at Deer Lodge City, says of mining at this camp:

"Sexton & Co., Dugan & Co., Hiland & Co., and Stone & Co., are each working four men on their bed-rock flumes, and taking out $500 each per week on an average. Jones & Co. have struck pay with their bed-rock flume, and are now opened out for work. This Company have been two years and a half in running the flume, which has cost $8000 or $10,000, and has been on bed-rock for some 1500 or 1600 feet without pay. They now have good pay for ten years to come."

BRUSSELS CARPET VS. BLANKETS.

THE same paper says: "A friend of ours furnishes us an item that may be of importance to miners and mill-men. It is a discovery in saving light, rusted, or rock-held particles of gold. It is the idea of, and in practical every-day use by Mr. William Flowers, whose arastras in Highland Gulch, crushing Only Chance and Nevins ore, make such gratifying returns. It is simply a piece of Brussels carpet used below the blankets. From this he cleans up an ounce per day that has passed over the plates, riffles, and blankets, and would go in the tailings but for this carpet. In it are caught the rock particles, leaf, and rusted gold, that neither of the other appliances will save. He considers this ounce clear gain, and is highly pleased with the discovery, using it all the time. It costs comparatively nothing, and we are permitted to give the hint for the benefit of others."

SILVER SMELTING AND COAL MINING AT ARGENTA.

THE Virginia City *Republican*, August 13th, says: "Griffith & Hanson have opened their coal mine, three miles this side of Argenta, to the depth of forty feet. The vein is six feet in width, bituminous, and of excellent quality. It burns freely, leaving a red-ash residum. The mine could not be more fortunately located for the convenience of the furnaces in Argenta. It will greatly diminish the expense of silver smelting.

"The furnace of Cummings & Veale, and that of Tootle, Leach & Co., are in full blast, with plenty of rich ore to keep them in constant operation. The district fully sustains the reputation it has acquired of being the best silver district yet worked in Montana."

MINING AT BANNOCK.

MINING in this district continues to furnish employment for a great number of laborers. The water brought in by the ditches is abundant, and gold in remunerative quantities is taken out by all.

"Gigray & Roach have completed their ditch to Grasshopper Gulch, a distance of seven miles, which a large company of miners are working with good results. The ditch carries 600 inches of water, enough for all practical purposes. It is about three miles from Bannack.

"The Bannack Ditch Company have taken out of their placers one thousand ounces of gold in the last thirty days. The gold is of very superior quality, and sold readily for $24.90 per ounce. The Company employes thirty hands, which receive from five to six dollars wages per day. Messrs. Brown, Bray, and others, have just completed a new ditch for mining the placers opposite the town. They are about to make extensive excavations in the bed of the creek. Dr. Hopkins, agent for the Butterfield Mining Company, has just returned to Bannack, after a year's absence."

Pennsylvania.

THE OIL BUSINESS.

WE take from the extended review of the Pennsylvania petroleum trade for the month ending July 31st, published in the *Titusville Herald*, the subjoined facts and figures:

THE PRODUCTION.

"The production during the month under review, as shown by the difference between the stocks held in the region on July 1st and August 1st, and the shipments meantime, was 11,697 barrels of forty-three gallons, or an increase over the product during June, as shown by a revised report for that month, of about 400 barrels.

"There was a considerable increase on Cherry tree and Upper Cherry runs, along the Allegheny River, and on the flats in the vicinity of Oil City. There was also something of an increase in the vicinity of Bean farm, on the Smith farm, and the Curtin tract, Lower Cherry run, and on West Hickory Creek.

"The following table shows the production during July, the average per day, the production previously reported in 1869, and the average per day since January 1st; the product from January 1st to August 1st last year, and the average per day for the same time:

	BBLS.
Total shipment of crude for July of bbls., of 45 galls. each,	353,281
Add to reduce to bbls., of 43 galls. each,	16,436
Total shipment of bbls., of 43 galls. each,	369,717
Stock on hand July 1st,	314,246
Stock on hand August 1st,	307,136
Deduct decrease on August 1st,	7,110
Total production during July,	362,607
Average per day for 31 days,	11,697
Production from January 1st to July 1st,	1,893,381
Total production since January 1st,	2,255,988
Average per day for 212 days,	10,641
Total production same time last year	2,021,206
Average per day same time last year (213 days),	9,489
Average per day during June last year,	10,698

"With the exception of a falling off in the product of the farms in the Bull Run district, there appears to have been no decrease of consequence. In the Pleasantville district there was a slight decrease. The product as obtained from the difference between stocks at the beginning and close, and the shipments during the month, averaged about 1200 barrels daily.

THE DEVELOPMENT AND THE TERRITORY.

"The number of wells in process of drilling increased slightly during July, and on August 1st the total number was 310, an increase of five. Besides the above there were about sixty leases on which operations had been commenced with a view to sink wells.

THE PRICE.

"There were very few fluctuations of importance in prices on the Creek during July, and for the greater part of the time the market was quiet but firm. At the beginning of the month quotations were given at 5.35 to 5.45 at Miller and Titusville, and at 5.65 on the Lower Creek. There were variations of ten to twenty cents from these figures, but at the close the prices of the early part of the month were paid."

Canada.

FROM THE MADOC MINES.

THE Belleville correspondent of the Toronto *Monetary Times*, writing under date August 16th, says:

"The interest of the Richardson Mining Company, in portions of the east half of lots 17 and 18, in the fifth concession of the township of Madoc, was exposed for competition, by public auction, in the Sheriff's office of the County of Hastings, on Saturday last, according to advertisement. The property under judgment consists of about 4¼ acres on lot 18, on which is situated the mine, with its store-houses and stamp-mill, etc.; and a village lot, with dwelling-house thereon, on lot 17. The first bid was $1000, followed by one of $4000, which ran up smartly by the thousand-dollar bids to $9000, where it stood for some time; another bid raised it to $12,800; after waiting for over half an hour, and not obtaining a higher offer, the Deputy-Sheriff announced that he would withdraw the subject, and postpone the sale until Saturday next, August 21st.

"Messrs. Turley & Gilbert are still working their mines on lot 6, in the ninth concession of Marmora, with good results. I handled on Saturday two very pretty bars of gold from their mill; one about 7 ounces in weight, the produce of a previous crushing, and the other about four and a half ounces, taken from the mine last week. On the last occasion, Mr. Gilbert, who himself superintends operations, did not 'clean up' thoroughly, but merely scraped the amalgam from the copper shoots and table, so that the above weight is probably not more than half of the actual produce of the week's crushing.

The success of the Mallorytown mine is now an established fact, according to the *Brockville Recorder*, the editor of that paper having lately visited the works, and observed the process of cleaning up, and the retorting of the amalgam. He states the proceeds of 16¼ tons of ore at 10 ounces of gold, worth $180, or something over $11 per ton.

"Messrs. Cook & Company have purchased Mr. W. Berry's mill, and are now having it removed from its late stand to their mine, on lot 7, in the ninth concession of Marmora, near Turley & Gilbert's. The gangue, or ore, on No. 7, is a vitreous quartz, with abundant arsenical iron pyrites; the gold exists in a free or metallic state, and can be seen by crushing and washing down, or, as the miner's say, 'panning out,' a portion of the vein stone."

MICA.

"AN extraordinary yield of mica has been made during the week past in the mines of the New-York Mica Company, in the township of Burgess. During the time stated, the Perth *Courier* is informed by the agent of the Company, Mr. J. Baker, that the value of mica taken out will amount to $2500 in gold. This may be considered a very good return for one week's work, where there were only nineteen men employed altogether."

California.

RICH STRIKE IN NEVADA COUNTY.

WE take the following account from a California paper: "The Eagle Company, at Grizzly Hill, near Snow Point, in Nevada County, struck a very rich strata of quartz and gold in their mine. The owners of this claim reside in Hartford, Conn., and they have had the mine worked under the superintendence of various parties for the past two years, and now it is in charge of Myron Foot. The Company, after spending immense amounts of money upon their claim, had nearly concluded that it would not pay to continue the work much longer, when to the delight of the Superintendent, a piece of rock weighing five pounds was thrown out, which was broken up and yielded a little over fifty dollars. This was found in the forenoon, and in the afternoon, the work being pushed ahead vigorously, a ledge was struck, measuring six feet in width, and in the centre was a strata about two feet wide of the richest lot of quartz ever seen in that section of the county."

ANOTHER STRIKE IN CALAVERAS.

THE *Chronicle*, August 7th, announces the discovery of a very rich lead of gold-bearing quartz, in the Petticoat mine at Railroad Flat: "From the one hundred-foot level to the bottom of a new shaft, which is two hundred feet in depth, nothing in the shape of a defined lode was found, and considerable anxiety was felt that perhaps much difficulty would be experienced in ascertaining the precise locality of the main vein. At the depth of two hundred feet it was thought advisable to run a traverse drift for the purpose of finding the lead, if one existed at that point. The research was rewarded by the discovery of a vein of exceedingly rich quartz, upward of eight feet in width, encased in well-defined walls, and having every appearance of being a true vein. None of the rock recently discovered has yet been crushed by the working process, but good judges are unanimously of the opinion that it will average from $25 to $30 per ton.

"Thirty-two tons of quartz taken from the Bald Eagle claim at Independence, owned by Gamble & Co., yielded over $1500 as per assay of Schlund, of our town. The rock was crushed in Smart's mill at Railroad, averaging $46.50 per ton.

"We were shown this week, a piece of pure gold, weighing half a pound. It was taken from the Mokelumne by a Chinese company."

Idaho.

WE learn from the Silver City *Tidal Wave* the following particulars of the recent incorporation of the Ida Elmore Company: "Capital stock, $1,000,000; 10,000 shares of $100 each. Trustees—D. H. Fogus, John M. Wilson, T. J. Bowers, L. W. Greenwell, and M. G. Gillette. We understand it to be Judge Bowers' purpose to remove to San Francisco, the principal place of business of the Company, to take charge of the office there. The Ida Elmore is one of our best producing mines, and her stock should be second to none in the market, yielding on an average about $60,000 a month."

Massachusetts.

THE CHESTER EMERY MINE.

THE emery mine at Chester, Mass., has undergone many vicissitudes, but is still operated. About a dozen men are now at work on it, which force will be increased in September. Foundations will soon be completed for another mill, seventy feet long by thirty wide, and two stories high. Into this a steam-engine will be placed and a shaft will convey power to the old mill adjoining. The machinery has previously been driven by water, of which there is, at some seasons, a great lack.

The Swiss Polytechnic School.

BY DR. ADOLPH OTT.

THIS great Scientific University is located at Zurich, the capital of the Canton of Zurich, which ranks the second in number of population, and seventh in extent of territory, among the Cantons of Switzerland. There are eight great divisions in the institutions, to wit: 1st, a school of architecture; 2d, a school of civil engineering; 3d, a school of industrial mechanics; 4th, a school of industrial chemistry; 5th, a school of forestry; 6th, a normal school of mathematics and natural science; 7th, a school of literature, moral sciences, and political economy, and 8th, a preparatory course in mathematics, the instruction therein being given both in the French and German languages. The length of the course for the three first divisions is three years; for the three subsequent ones, two years, with the exception of the mathematical section of the sixth division, and the eighth division. The course of this latter extends over only one year. The seventh division has been formed simply for the promotion of the general education of the pupils. A regular course of study in this division, for a given time, is not considered obligatory upon the student. The courses begin in October, and are divided into a winter and summer semester. There are three vacations; one of eight weeks in the fall, one of three in the spring, before the commencement of the courses of study, and one of a week's length at Christmas.

As accessory means for instruction, there are libraries, collections of designs, bust-plaster casts of structural anatomy, plaster models of architectural ornaments for the various branches of the instruction in drawing, collections of building-materials, and models of construction, models of machines, and instruments used in land-surveying, tools and materials for the instruction in industrial mechanics; models and wares for instruction in technical and pharmaceutical chemistry; collections of objects important to foresters, and zoological, botanical, mineralogical, geological, and paleontological collections. There is also an archeological collection; a workshop for making models in clay and plaster; a workshop for models in wood; a workshop for models in metal; a laboratory for analytical chemistry; a laboratory of chemistry for technical and pharmaceutical operations; a cabinet of natural philosophy; an astronomical observatory; a botanical garden, and a number of other collections and libraries given into the hands of the school for use by the city and Canton of Zurich, according to agreements made between the latter and the Federal Government. The school receives an annual support of $45,000 gold from the Federal Government, and a similar sum from the Government of the Canton of Zurich.

Bridging the Connecticut.

IT has been decided that a bridge shall be built over the Connecticut River at Middletown, for the Air-line railroad between New-York and Boston. The bridge is to be of wrought iron, and will be 1248 feet long, with a draw of two openings of 160 feet each. The whole draw is to be 303 feet long, and is to open and shut in one minute and thirty seconds. The bridge is to have a strength equal to two tons to the running foot, beside its own weight, and is to be capable of sustaining a train of locomotives passing over it at the rate of sixty miles an hour. The name of the new railroad of which this bridge is a part is the New-Haven, Middletown, and Willimantic Railroad, which, together with the New-York and New-Haven Railroad, and the Boston, Hartford, and Erie Railroad which it connects, will constitute what is known as the "Air-line" Railroad, running in a pretty straight line from New-York to Boston. By this route a distance of nearly thirty miles will be saved, and the time of transit will be shortened by an hour and a quarter. The road will be opened within a year; and the bridge is to be completed in eight or nine months.

Works on the European Continent.

AN important work has been proposed to the Committee of the Iron-masters of Champagne—namely, the direct connection of the canal of Saint Quentin and the Sambre with that of the Aisne and Marne. It is proposed to start from near the junction of the lateral canal of the Oise with that of Saint Quentin, and to touch the lateral canal of the Aisne at or near Berryenbac or Vailly. The proposed canal will effect a saving of more than thirty miles of water carriage between the north and east of France. One of the members of the Committee has been deputed to examine the project with respect to its utility, economical advantages, probable cost, and best means of execution.

In connection with this project is that of deepening the canals of the north and east of France, so as to insure at least six feet of water throughout. It is estimated that this depth may be assured between Saint Dizier and the Belgian frontier, by an expenditure of about £40,000. The cost of deepening the remaining canal—that which connects the Marne and the Rhine—is not yet ascertained.

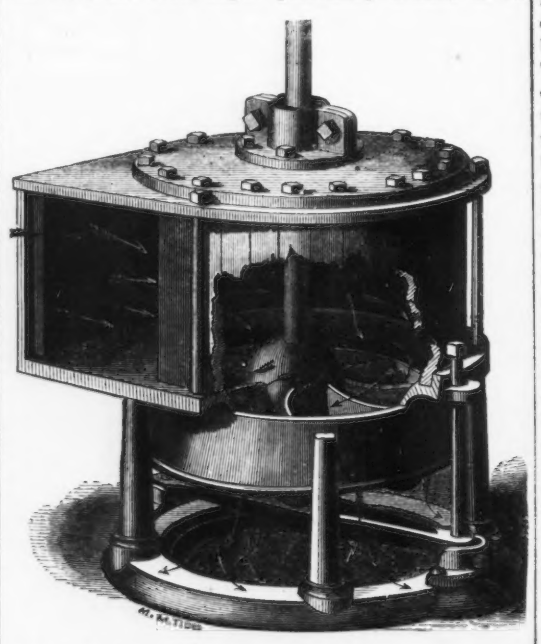
Prussia seems determined to emulate France in every way. The development of her railway system is one of the most important undertakings which she has now taken seriously in hand. A loan, amounting to seventeen and a half millions sterling, is about to be raised for this object; and in order that the scheme may be carried out thoroughly, and local difficulties avoided, the loan is to be raised by a commission formed by the whole of the great railway companies, to whom the Government has entrusted the operation, and which will be covered by the collective guarantees of the companies.—*Exchange.*

The Chase Wheel.

THE accompanying illustrations may be considered very good views of the water-wheel made by the Turbine Water-wheel Manufacturing Company, of Orange, Mass.; J. D. Chase and Sons, Agents. The claims of this wheel, as set forth by the manufacturers, are: The yielding of as full a percentage of power as any similar wheel; a large capacity and consequent reduction in size for a given amount of power, if required, and, finally, its compactness and simplicity.

It is always set submerged, thus utilizing the entire head and fall, permitting the water to discharge against water and not against the atmosphere, rendering a more even, steady motion, and free from freezing. It is completely adapted to both high and low heads, large or small supply of water, having a more than three-fourths *variable capacity*, giving a full uniform proportion of power from a reduced capacity or part gate.

It is the only wheel combining completely the direct and the reaction of the water. It has the most convenient, substantial, and adjustable *bridge-tree*, to obviate the wear of the step, although seldom liable or even possible. It is the only Jonval or vertical discharge Turbine-wheel ever made, with the water applied without using stationary guides, the helical scroll, or shutes. The water must be kept solid, undivided, and acute angles particularly avoided in its



coming to, acting upon, or discharging from a wheel. It is not more important to apply water to, than to discharge it properly from a wheel, to obtain the most complete result.

The Company also make a specialty of circular saw-mills and gearing.

Roman Remains.

AN interesting discovery has been made near Corbridge, by which the true site of the Roman bridge which crossed the Tyne there has been ascertained. From flagging to a considerable extent existing in the bed of the river on the south side, together with several wrought-stones lying at the water's edge in a confused heap, it was supposed that the ancient bridge had crossed from that point, and a long and close scrutiny of the river-bottom, from side to side, was made by Mr. Greenhow, but without being able to discover the slightest indication of any piers having ever existed in that direction. The examination of the bank above, by excavating, was carried on to an extent sufficient to show that no structure had been erected there. The whole bank side, at a depth of about two feet from the surface, exhibited a complete system of penning, of the most substantial and perfect construction, which is carried down to the bottom of the river, where it joins the flagging mentioned above. It became evident that this elaborate defence of the bank and river-bottom, was to give security to the bridge, which must be looked for farther down the river. Following the penning on the bank to the eastward, a wall was found, slightly curving from the centre to each end, from the river. The front of this wall is penned by large stones, overlapping each other at an angle of about 60 deg., leaving only one-fiftieth of the breadth exposed to the action of the water. Consequently, they are as secure in their position as when first placed by the builders. Mr. Greenhow saw that on the opposite side of the river there was an accumulation of stones, and also that the rock cropped out, narrowing the channel. He felt satisfied that an engineer would choose that point to start a bridge from, as it offered so secure a foundation. Acting on this idea, an examination was made, and remains of the land-pier were found on this rock, which only stands about four feet from the bank, beyond which the river-bottom consists of mud and shingle. At a distance of fifty feet from the face of the land-pier, the foundations of the first pier were found, by removing about a foot of mud. They are constructed in the very strongest possible manner, a strong oak frame-work enclosing stones five feet long by twelve inches broad, the oak again inserted across at every five stones, secured to a centre-piece, which traverses the whole. At the east end, piles are driven in to secure the platform from moving The most interesting ruin is one of the oak beams of the bridge lying on this foundation, buried in mud and rubbish.—*London Architect.*

Geology of the Lake Superior Iron Ore Beds.

WE acknowledge the courtesy of Mr. T. B. Brooks, Civil Engineer and Expert in Iron Ores, Mines, and Blast Furnaces, and Assistant on the Geological Survey of Michigan, Negaunee, in sending us the first genuine geological section which has as yet happened to fall under our notice of any one of the great magnetic ore beds of Lake Superior. It is evidently drawn with care and compiled from a sufficiently large amount of exposed surface to be reliable. It puts quite a new face on, not only the amount but the relation of the ore to the wall rocks. Some of these beds have been described as vertical veins a thousand feet thick. There was evidently some mistake about it; but the country was wild and the trial-shafts were holes in the surface. Now that extensive quarries have been hollowed out, the true structure appears. In this particular mine, "the Lake Superior," as it is called, four quarries have been opened in a north and south line across the ore belt; a hoisting and pumping slope about 125 feet deep has been sunk at an angle of about 70°, and levels driven from its bottom and in various directions. Those driven south and east found ore, those driven north and west found none. In other words, the ore is a stratum 50 or 60 feet thick, crumpled beneath the surface, like a sheet of a corrugated iron used for roofing, in five narrow parallel basins, running east and west, and sinking slowly eastward. The bed lies on a crumpled surface of chlorite rock; and has over it a crumpled roof of talc and chlorite rock. Some of the ore is a mixture of specular hematite and quartz; sometimes the quartz is interlaminated with the ore, sometimes broken up into a breccia. The distance across from the south edge of the south quarry to the north edge of the north quarry is 600 feet, which is, so far as is known now, the total breadth of the "hard ore belt" at this point. There is brown hematite (limonite) ore 400 feet still further south, resting on a floor of greenstone trap. The Barnum mine is on a continuation (500 feet further to the west) of the northernmost quarry outcrop. The axes, which separate the five little basins or troughs, incline, Mr. Brooks says, to the west, and "sometimes undulate so abruptly as to produce forms approaching a hemisphere; and, in some instances, ear-shaped basins." This description reminds us of that remarkable corrugated deposit of gold-bearing quartz, 12 miles back of Halifax in Nova Scotia, which yields the so-called "barrel ore." We would gladly reproduce the lithographic section to illustrate the above description; but in default of that, refer our readers to Mr. Brooks' "Notes on Geological Structure and Modes of Working the Iron Ore Deposits of the Marquette Iron District, Michigan," in which it is published. A stereoscopic view of the ore quarries accompanied the sketch section.—*Mining Register.*

Double Tubular Bridge in Italy.

THE tubular bridge in two stages, one over the other, which has been constructed on the Poghera-Pavia line between Genoa and Milan, over the Po, is a remarkable work. It consists of ten parts, each of 240 feet span, resting on nine piles and two shore abutments. The total length of the metallic superstructure is, in fact, 2517 feet, and with the abutment walls and approaches, 2720 feet. The height of the bridge above the water is 62 feet.

The following is the bill for the work:

Foundations and masonry,	£118,592
Defensive works,	16,410
Metallic superstructure and accessories,	173,323
About £340 per yard.	
	£308,325

THE ENGINEERING AND MINING JOURNAL.

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Special Notice to Subscribers.

THE subscription-books of THE ENGINEERING AND MINING JOURNAL are in course of revision, and every subscriber whose account is in arrears will be erased from the list. Those, therefore, who do not receive the paper after this number will know the reason why.

Prognosticating the Weather.

EVERY one is always so much interested in the state of the weather that the expression of opinions as regards what it is to be, has, by general consent, become a subject of common conversation. Apparatus for this purpose are often recommended; they can, however, never amount to any thing. The new device recently brought out by Bonneville, of Paris, is recommended by the public press only from ignorance of the principle upon which it works. This principle is one that by no means enables us to foretell the condition of the weather. It may be called rather a very imperfect form of hygroscope—that is, an instrument which indicates the relative degree of saturation of the air with moisture. It is surprising to note the fact that scientific papers even speak of this hygroscope of Bonneville as "an apparatus for prognosticating the weather."

All contrivances of this nature are either hygrometers, barometers, or thermometers, and that, either openly or in disguise. Separately they are utterly worthless, but used together and simultaneously, some valuable conclusions may be drawn, and predictions made, which will, no doubt, often be verified. But it must be confessed, also, that they will often fail. Such was our experience many years ago, when, furnished with a complete set of apparatus—thermometers, barometers, hygrometers, etc.—we began theorizing and prognosticating concerning the weather. The result was this: We soon perceived that we were not only losing ground as a trustworthy individual, but were also bringing science into contempt, in our bootless pursuit. The upshot was, that long ago we abandoned the calling of a weather-prophet in disgust, as bringing only disappointment and discredit to its devotees.

An apparatus which does not measure the amount of heat, but only indicates its increase or decrease, is not properly called a thermometer, but a thermoscope. A bottle inverted in water and partially filled with it may be called a thermoscope. The expansion and contraction by heat of the air in the bottle cause the water to descend and ascend, and thus indicate roughly the changes of temperature that occur. A like result occurs in the case of the camphor solution enclosed in a sealed glass vessel, in which the camphor, upon a decrease of temperature, crystallizes, and upon an increase, redissolves. Notwithstanding the small practical value of these contrivances, there are, nevertheless, persons who lose much valuable time by observing them and making predictions. They forget when their predictions are not fulfilled, since it would be very disagreeable to them to have their illusion dispelled, as then the better part of what they consider an agreeable occupation would be gone.

An apparatus which does not measure the amount of atmospheric pressure, but only indicates changes, must, for the same reason, be called a baroscope, and not a barometer. Many so-called aneroid barometers are nothing but baroscopes, since their indications, read of by means of the scale, do not correspond at all with the height indicated by a truthful mercurial barometer. The inverted bottle, spoken of above, is also, to a certain degree, a baroscope, as change in atmospheric pressure affects it slightly.

In the Farmers' Club of the American Institute, last year, it was the unanimous opinion of those who knew from experience, that the barometer was utterly worthless as an adviser to the agriculturist, and it appears to be a fact that the instrument is much less trustworthy upon this continent than in Europe. Those who have observed its indications in both localities agree upon this point. One fact is certain, however, that a sudden fall indicates heavy winds, but usually unaccompanied by rain. The manufacturers of barometers have contributed not a little to the unenviable reputation of this instrument by putting upon the scale the words, "much wind and rain;" it should be, "much wind or rain."

Finally, an apparatus which does not measure the direct amount of watery vapor present in the atmosphere, nor even its relative degree of saturation, is not a hygrometer, but simply a hygroscope; and most pieces of apparatus so frequently sold as novelties, and recommended for predicting the condition of weather, are of this class. They are constructed on the principle either of the expansion of a substance which easily absorbs moisture, such as hair or catgut, or on the property that tightly twisted ropes, of the proper material, have of untwisting, upon being enlarged by the taking up of moisture. Some vegetable products, which twist or expand by change of moisture, have also been introduced; but in all of them, as well as in the true hygrometers, the present condition only of the weather is indicated. The only reason that, when hygroscopes indicate much moisture, rain sometimes follows, is this: It is more likely than otherwise that rain will fall when the air is saturated with watery vapor. Nevertheless, often by a change of wind, the watery vapor is dispelled without a rain-fall; and inversely, an indication by the hygroscope of dryness is often followed by a sudden thunder-storm and heavy rain. Trustworthy predictions belong, therefore, as yet, to the future. Thus far, the electric telegraph is the only instrument that can be at all depended upon. As the greater number of changes come from the south-southwest, a knowledge of the state of the weather in that direction gives us the means of judging as regards what to expect; but even this means very often proves untrustworthy. An unobstructed view of the whole sky, combined with an observing mind, good judgment, and a long experience, appear to be the proper requisites for prognosticating the weather, and occasionally we meet with an old sea-going man, who, upon looking at the sky, is as certain about the weather as is an expert who detects a counterfeit bank-note by merely looking at it.

The Hepburn Roller-Pan.

THERE has been no lack of inventions in this country as regards the matter of machinery for mining and metallurgical processes during the few years that have passed since the mining fever set in. But, unfortunately for the success of the cause it may have been intended they should serve, how many of them have proved totally worthless! In the main, they have been a serious hindrance in the way of the proper advancement of the mining and metallurgical industry. We should, perhaps, hardly overrate the matter were we to say that, in the course of the past six years, there has been iron enough used up in the manufacture of worthless patent mining machinery for the construction of a double track of rails upon the Pacific road from Kansas to California. If report is true, however, we gather a little satisfaction in the thought that now and then there is among the many failures an assured success. For instance, an exchange tells us that the new Hepburn Roller-Pans for the amalgamation of silver and gold ores have given, in the numerous very thorough trials that have been made, very satisfactory results, and that quite a number of them have been made already for Virginia City, White Pine, and California. As an indication of the manner of their construction, we append the following:

"Their construction is peculiar and radically different from the pans heretofore used in our mills. The muller does not grind on the bottom of the pan, but carries on its upper side dies, upon which the rollers rest and grind when the muller is put in motion. These rollers also grind upon a ring-die fixed to the side of the pan, being thrown by centrifugal force against the same, and also grind against each other, thus furnishing three distinct grinding surfaces. The action of the rollers is, in effect, a sun and planet movement, without the intervention of special mechanism for this purpose. The rollers are all free and loose in the pan, and produce a rolling rather than a dragging or rubbing friction. The results from large work show that with equal quantities of ore at a charge, not more than half the power is required of the ordinary pan. The ore is fed to the pan in pieces of the size of from ¼ to ¾ of an inch in diameter, being reduced to this size by a crusher or pair of rolls—no battery being required—and the work being done in the same time as in the ordinary pan or pulp from the batteries. The charge in these pans is from 2500 to 3000 pounds, according to the nature of the ore. The estimates of cost show that a mill on this system can be built for much less than the ordinary stamp-mill of the same capacity, and that an important advance has been made in the improvement of our mining machinery."

Light on the Erie.

WE clip the following from one of our exchanges:

"The Erie Railroad Company are about to illuminate the whole of their road by a novel plan. From New-York to Buffalo it is designed to apply the electric light to each locomotive, and stationary lights at the ferries, in the tunnel, and at all the dangerous curves along the route. The arrangements for manufacturing the electric lamps are already completed. Two lamps will be used for lighting Bergen tunnel, with one in the middle. Other lamps will then be stationed at each end of the Pavonia ferry, which will throw a broad belt of light across the North River every night. These lights will, it is said, be so intense that on the darkest foggy night there will be no fear or danger of collision on the water. Still more, it is proposed to fill Twenty-third street every night with a flood of white light, from the North River to the Fifth Avenue Hotel."

We learned some time ago, that Mr. Fisk was anxious to add to the comfort and safety of passengers on the Erie Road by introducing some powerful means of lighting the tunnel and ferries, and we regretted at the time that his scientific advisers had fallen into the mistake of recommending the use of the electric light, especially that which is produced by the agency of the Voltaic battery. That such a light is powerful and intense, there is no doubt, for we have frequently by its means illuminated a large hall so brilliantly that the gas-lights faded into the semblance of mere smoky torches; but that this light is unavailable for practical purposes is perfectly well known to every scientific man. Therefore, unless his advisers have made discoveries of radical importance in relation to the subject, we have no hope that Mr. Fisk's very laudable efforts will culminate in success. At the same time, we feel inclined to believe that by adopting suitable and well-known means, much might be done to attain the object that he has in view.

Floating Docks.

WE reproduced some time ago, from one of the English journals, an article on the Bermuda Floating Dock, which is one of the great projects in the construction of which the skill of the engineer of the nineteenth century is displayed. The London *Architect* talks so eloquently, and, at the same time, so truthfully in regard to the matter, that we cannot help giving the following from one of the pages of that journal entire:

"How gracefully does Science make the *amende honorable*. She plunges into the deepest depths of difficulty, and lifts up with a smile and an apology that render the difficulty covetable. Projectile force destroys all our calculations respecting inert resistance; then we ask of iron both unsinkability and overwhelming strength. Huge creations of engineering skill, with death-dealing prows, revolving turrets, and ever-discharging shot—mighty arks of iron, whose dimensions dwarf into nothingness the proudest of our wooden warriors—upraise themselves at the call of engineering skill; and Science drives and guides them safely through the terrible Atlantic, making some the handmaids of electric communication between the Old and New Worlds, and others the terror of the evil-doer. Our last fright was concerning the defenceless condition of our coasts; our last difficulty how to repair, victual, and coal the daily-increasing fleets of war-vessels and merchantmen. The Bermuda Floating Dock is the answer, and it is one that is satisfactory and complete. In the autumn gales it will be a haven of life; in all time a boon never to be undervalued by those who brave the terrors of the ocean."

The East River Bridge Project Under Way.

WE are glad to know that work on the East River Suspension Bridge has already begun, and that in good earnest. It is, moreover, gratifying to learn that the services of Col. W. H. Paine—throughout the late war one of the most distinguished engineers attached to the Headquarters Staff of the Army of the Potomac—have been secured, and that in association with Col. Roebling, the Engineer-in-Chief, he has already entered upon the discharge of the duties incumbent upon him. The surveys for the bridge are already completed upon the Brooklyn side, and also the triangulations across the river. Work is now progressing rapidly on the New-York side. The work of putting in the foundations for the piers, etc., will soon commence; the timber for their construction having been already contracted for. With the combination of eminent engineering talent employed, there can be no question as regards the successful and, other things equal, rapid prosecution of the work. We congratulate ourselves in the hope that soon we shall have at least one engineering structure to which we may refer as combining the two qualities of utility and beauty—a structure that will rank as one of the boldest in conception, and best in plan and execution of any in the world.

The Saxon Colliery Explosion.

DETAILS of this have at length reached us through the columns of the foreign press. One thousand widows and orphans are left to mourn the loss of those who came to an untimely death in the workings of the mines. In our Mining Summary will be found quite a full account of the fearful disaster.

MARKET REVIEW.

The Coal Trade.

NEW-YORK, August 27th, 1869.

TELEGRAMS received in this city yesterday afternoon informed the trade that the Delaware, Lackawanna, and Western Railroad Company had made terms with their men so long on a strike, and that operations would be resumed on Monday next, August 30th. Simultaneous with this bit of news, it was announced that the seventy-fourth auction sale of the Scranton Company would be held on Wednesday next, and 80,000 tons of coal would be sold. The first information was not entirely unexpected, although many believed that the men would not budge an inch from the position they had taken. The news, however, brought a feeling of relief among dealers, and future prospects were immediately canvassed. The notice of the auction sale (that peculiar institution of the coal trade, without which we have got along seemingly well enough the past three months) caused considerable commotion and speculation, and totally unsettled every thing in the way of prices; and to-day we find the market without any quotations.

There is much speculation among dealers as to what course prices will take at the sale. Calculations, however, are prefixed by that unsatisfactory "if" and have no value. We are not satisfied that the Delaware and Hudson men will necessarily follow the Scranton men in their action; but it is generally believed here that the voice of one is that of the other. At the same time it makes a great difference whether such is the case or not, and dealers should not be in too great a hurry to adopt conclusions.

Then, again, a large portion of the "Lehigh District" is on a strike, as noted in our last issue, so that, if both the companies resume work, it is merely the same men giving up work in one place and resuming in another; and are we not virtually in the same position as before? We would, therefore, counsel dealers to be very cautious in their actions. There will be a large assembly at the auction sale, and no doubt great excitement will prevail. *Keep cool.* Do not run prices up in competition with your neighbor. With all the regions at work, which will be the case in a few days, or two weeks at the farthest, all kinds of coal will be in plentiful supply. We think, if the sale brings an average of $7 per ton, it is enough in order to keep the market in a healthy condition. During the recent troubles in the Anthracite regions, the Cumberland, or George's Creek, Maryland, semi-bituminous coals have, in consequence of their low prices and superior steam-making properties, largely taken the place of anthracite coal. We learn that the Cumberland Coal and Iron Company are producing in their mines some 1000 tons per day, and that several of the European Steamship lines, the Troy line of steamers, Ferry Companies, and large manufacturers have adopted it, and like it better than anthracite coal. These Cumberland coals have generally sold about $1 per ton higher than anthracite coal for steam purposes.

The notice of the auction sale will be found in our advertising columns. Prices are nominal. Next week we hope to be able to give a more satisfactory condition of affairs, and give the September prices of the various companies.

Freights are a shade lower. Vessels are in good supply.

PHILADELPHIA, August 26th, 1869.

The market is dull. Freights are lower, and vessels are offering freely at $2.25 to Boston. The general feeling among the shippers here is that the men in the Scranton region will soon be to work, notwithstanding the reports to the contrary.

The following table exhibits the quantity of Coal passing over the following routes of transportation for the week ending August 21, 1869, and to the same period last year:

COMPANIES.	1868. WEEK.	1868. TOTAL.	1869. WEEK.	1869. TOTAL.
Phila. & Read. R. R.	37,690	1,733,241	99,651	2,183,847
Schuylkill Canal, ..	5,078	488,749	10,640	437,608
Lehigh Valley R. R.	45,764	1,441,357	44,392	1,429,604
Lehigh & Sus. R. R.	11,089	265,692	21,143	514,308
Lehigh Canal, ..	33,877	477,879	37,288	418,469
Scranton North, ..	13,850	338,642		587,631
" South, ..	23,231	692,508		205,857
Penn. Coal Co., rail.	20,522	567,695	23,553	608,391
" " " canal.	1,190	17,244	119	10,715
Del. & Hudson Rail.			97	102,866
" " " canal, N.	50,625	917,934	13,277	660,305
" " " " S.				
Shamokin,	8,405	299,965	15,146	244,638
Trevorton,	560	12,429	1,734	14,574
Short Mountain,	3,428	63,651	2,656	63,220
Lykens Val., Can. Co.	2,095	54,312	1,558	43,221
Hunt'g'n & B'd Top.	6,389	152,701	6,764	224,242
Wyoming South, ..		118,549		145,848
" North. ..	1,50	22,711	5,552	13,218
Williamstown, Col'y	5,614	110,957	6,679	123,309
Total, ...	271,008	7,776,016	290,249	8,031,871
1869, ...			271,008	7,776,016
Increase week, ..			19,241*	255,755

Schuylkill Coal Trade.

Report of coal transported over the Schuylkill Canal for the week ending Thursday, August 19, 1869.

	Tons. Cwt.
From Port Carbon,	5,658 00
" Pottsville,	418 00
" Schuylkill Haven,	12,732 10
" Port Clinton,	831 00
Total for week,	19,639 10
Previously this year,	417,961 04
Total,	437,600 14
To same time last year,	488,749 09

Report of coal transported over the Philadelphia and Reading Railroad during the week ending Thursday, August 19, 1869.

	Tons. Cwt.
From St. Clair,	41,803 03
" Port Carbon,	6,067 03
" Pottsville,	3,389 06
" Schuylkill Haven,	28,399 12
" Auburn,	3,784 12
" Port Clinton,	13,994 08
" E. P. R. R.	69 19
" Harrisburg and Dauphin,	14,267 16
Total paying freight,	111,865 19
Coal for Company's use,	2,170 18
Total for week,	114,036 17
Previously this year,	2,426,409 09
Total,	2,540,446 06
To same time last year,	2,015,916 11

Lehigh Canal Coal Trade.

Shipped for the week ending August 21, 1869.

WHERE FROM.	WEEK. Tons. Cwt	TOTAL. Tons. Cwt.
Total M. Chunk Region,	12,526 19	119,033 15
" B. Meadow "	5,891 16	65,978 05
" Mahanoy "		1,907 01
" Hazleton "	5,527 05	108,404 02
" Upper Lehigh "	474 00	5,109 03
" Wyoming "	12,868 01	118,036 16
Grand Total,	37,288 01	418,469 02
Corresponding week last year,	33,877 01	477,879 08
Increase,	3,411 00	
Decrease,		59,410 06

Report of Coal Transported over Lehigh Valley Railroad

For the week ending August 21, 1869, and previously this season, compared with the same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt	PREVIOUSLY Tons. Cwt.	TOTAL. Tons. Cwt.
Total Mahanoy,	14,700 04	243,183 12	257,883 16
" B. Meadow,	10,905 08	250,855 15	261,761 03
" M. Chunk,	10 05	150 10	160 15
" U. Lehigh,	106 09	8,475 02	8,581 11
" Hazelton,	5,960 06	661,617 10	667,577 16
" Wyoming,	13,699 03	261,344 19	275,044 02
Total,	45,381 15	1,425,627 08	1,471,009 03
To L. & S. R. R., at P'n Hav. for rail,		4,174 00	4,174 00
Do. for canal,	5,432 14	106,581 05	112,013 19
At Mauch Chunk for Canal,	5,812 03	63,705 01	69,517 04
Total Anthracite,	56,626 12	1,600,087 14	1,656,714 06
Susquehanna Region Bit. Coal (Fall Creek),		552 03	552 03
Tl. by rail & canal,	56,626 12	1,600,639 17	1,657,266 09
Same time last y'r,	60,134 19	1,571,158 07	1,631,293 06
Increase,		29,481 10	25,973 03
Decrease,	3,508 07		
Forw'd east from M. C'k by rail,	44,391 18	1,385,212 12	1,429,604 10
Same time last y'r,	45,764 12	1,441,357 17	1,487,122 09
Increase,			
Decrease,	1,372 14	56,145 05	57,517 19

RECAPITULATION:

Forw'd east from M. C'k by rail,	44,391 18	1,385,212 12	1,429,604 10
Del. at M. Chunk,	10 06	665 17	676 03
Del. on line of r'd above M. Chunk,	48 10	5,598 08	5,646 18
Del. ab. M. C. for use of L.V.R.R.,	882 00	28,997 07	29,879 07
To N. C. R. R., at Mt. Carmel,		2,516 09	2,516 09
To L. & S. R. R., at P'n Hav., for r'l,		4,174 00	4,174 00
Do. for canal,	5,432 14	106,581 05	112,013 19
Do. Packerton for rail,	49 01	3,188 18	3,237 19
At Mauch Chunk for canal,	5,812 03	63,705 01	69,517 04
Total,	56,626 12	1,600,639 17	1,657,266 09

Lehigh and Susquehanna Railroad.

Report of Coal shipped South for the week ending August 24, 1869.

WHERE FROM.	WEEK. Tons. Cwt	TOTAL. Tons. Cwt.
Total M. Chunk Region,	5,997 10	98,536 17
" Hazelton "	5,449 00	109,937 16
" Upper Lehigh "	852 04	76,923 01
" Wyoming "	27,069 12	456,562 08
Grand Total,	39,368 06	741,960 02
Corresponding week last year,	28,961 19	506,710 04
Increase,	10,406 07	235,249 18
Decrease,		
Forwarded South from Mauch Chunk,	20,331 06	474,216 18
Delivered on line of L. & S. R. R., above Mauch Chunk,	811 08	20,246 14
Delivered to Lack. & Bloom. R. R., at Plymouth Bridge,		14,693 06
Delivered to L. V. R. R. Co., at Sugar Notch,		5,151 03
Delivered at Coal Port, for Shipment by Canal,	18,225 12	227,652 01
Total,	39,368 06	741,960 02

Cumberland Coal Trade.

B. & O. RAILROAD.

The shipments over the Baltimore and Ohio Railroad for the week ending August 21st, 1869, were as follows:

From Cumberland and Pennsylvania R. R.

	Tons.
Consolidation Co.,	3,199.11
Borden Co.,	1,723.09
Balt. & Hampshire Co.,	658.00
Midlothian Co.,	885.04
Cooke,	486.12

From Eckhart R. R.

C. C. and I. Co.,	2,936.19

From George's Creek via Piedmont.

George's C. C. & I. Company,	2,189.15
Central "	2,959.03
Atlantic "	2,001.09
Piedmont "	2,408.05
Swanton "	1,567.14
American "	2,389.15
Barton "	908.06
Potomac "	1,978.01
Franklin "	1,440.13
Hampshire "	1,829.03
Total,	19,672.04

BY C. & O. CANAL.

For the week ending August 21st, 1869, the shipments by the Chesapeake and Ohio Canal were as follows:

	Tons.
American Co.,	3,732.18
Borden Co.,	2,597.17
Central Co.,	3,572.16
Consolidation Co.,	2,733.12
C. C. & I. Co.,	1,918.02
Hamp. and Balt. Co.,	1,386.17
Midlothian Co.,	1,082.16
George's Creek Co.,	761.09
Maryland,	538.02
For private parties,	1,076.00
Total for week,	19,400.09

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW-YORK, Aug. 26th. R. A.	W. A.	AT PHILADELPHIA, Aug. 26th. R. A.	W. A.
SCHUYLKILL.				
Lump,	$....	$8 25	..	6 50 to 7 00
Steamer,	....	8 25	....	6 50 to 7 00
Broken,	....	8 25	7 00	6 50 to 7 00
Egg,	....	8 25	7 00	6 50 to 7 00
Stove,	....	8 50	7 00	6 50 to 7 00
Chestnut,	....	7 50	6 25	5 50 to 6 00
Pea,	....	....	....	....
LEHIGH.				
Lump,	8 50	....	7 75	....
Steamer,	8 35	....	7 75	....
Broken,	8 35	....	7 75	....
Egg,	8 35	....	7 75	....
Stove,	8 50	....	8 00	....
Chestnut,	8 00	....	7 00	....
Pea,	...	...	5 25	....
SPECIAL COALS.*				
Diamond Vein,	R. A.	8 75	....	....
New-England,	"	....	....	....
Locust Dale,	W. A.	8 50	....	....
Honey Brook, Le'h	"	8 35	....	....
Harleigh,	" "	8 35	....	....
Spring Mount'n	" "	8 35	....	....
Sugar Creek,	" "	8 35	....	....
Sugar Loaf,	" "	8 35	....	....
Fulton,	" "	8 35	....	....
Stout,	" "	8 35	....	....
Old Comp'y's	" "	8 35	....	....
Cross Creek,	" "	8 35	....	....
Chauncey,	" "	....	....	....
Girardville,	" "	....	....	....
McMichael,	" "	....	....	....
Duncan,	" "	....	8 00	....
Shamokin,	" "	8 25	7 50	....
Lykens Valley,	" "	....	8 00	....
Broad Top,	" "	....	5 25	....
Hill & Harris,	" "	....	7 00	....
Henry Clay,	" "	....	7 25	....
Powelton,	" "	....	7 25	....
Burnside,	" R. A.	....	8 00	....

[* Dealers in these coals may be found in our advertising columns.]

Kittaning Coal Co.'s Phœnix Vein, f. o. b.	$5 25
Lemon " " "	5 00
Cumberland C. & I. Co.'s on board,	7 25

Company Coals.

	L.	Str.	Gra.	Eg.	Sto.	Cst.
Scranton at E. Port,	..	..	..	..	..	..
Pittston at Newb'g,	..	..	..	..	..	..
Lacka'na at Rond't,	..	..	..	..	..	..
Wilk'b're at Hob'kn,	..	..	..	..	..	..

For freights to different points, see "Freights."

Prices for Coal at Mauch Chunk.

	L.	Str.	Gra.	Eg.	Sto.	Cst.
Lehigh,	$	$	$	$	$	$
Wilkesbarre,						

Freight to Elizabethport, $3.17; to New-York, $2.35.

Prices of Foreign Coals.

August, 1869.
Duty, $1.25 per ton.
Corrected weekly by PARMELEE BROS., 32 Pine-street, New-York.

Liverpool Gas Caking,	$ 9 50	
" " Cannel,	14 00	
" House "	17 50	18 00
" " Orrel,	16 00	18 00

Per ton 2240 lbs., Ex. Ship.
PRICES FROM YARD.

Liverpool House Orrel, screened,	$16 00	$18 00
" " Cannel, "	17 00	20 00

Per ton 2000 lbs., delivered.

Prices at Baltimore, August, 1869.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load,	$8 00	$8 60
Pittston and Plymouth,	$7 75	8 45
Shamokin R., or W. Ash,	7 75	8 00
Lykens Valley, R. A.,	7 60	7 80
Trevorton, R. A.,	7 25	7 50
By retail, per ton of 2240 lbs. delivered,	9 00	9 75
Georges Creek & Cumberland f. o. b. at Locust Point for shipping,		5 00
West Fairmount Gas, f. o. b.,		6 19

Prices at Georgetown, D. C., & Alexandria, Va.

August, 1869.

George's Creek & Cumberland f. o. b. for shipping,	$4 75

Prices at Havre de Grace, Md.

August, 1869.

Wilkesb're & other White Ash for cargoes,	$7 50	$7 75
Lykens Valley,		7 75
Shamokin R. or W. Ash,	7 50	8 00
Trevorton and Zerba Valley,		7 50

Freights.

August, 1869.

To Eastern Ports.	From Philadel'a.	From E. Port and Port Johnston.	From Newburg.	From Rondout.
Stamford,	$2 00	$1 00	$1 25	$1 25
Norwalk,	2 00	1 00	1 25	....
Bridgeport,	2 00	1 15	1 25	1 25
New-Haven,	2 00	1 00	1 25	1 25
Hartford,	2 75	1 10	....	1 65
New-London,	2 00	1 15	1 35	1 35
Norwich (and tow),	2 00	1 25	1 45	1 45
Mystic,	2 00	....	1 40	....
Stonington,	2 00	....	1 40	1 35
Sag Harbor,	2 00	....	1 40	....
Bristol,	2 00	....	1 55	1 60
Newport,	2 00	1 40	1 55	1 60
Fall River,	2 00	1 40	1 55	1 60
Providence,	1 90	1 40	1 60	1 60
Dighton,	....	....	1 60	....
Warren,	....	....	1 60	....
Pawtucket,	2 00	....	1 75	1 75
New-Bedford,	2 00	1 40	....	1 75
East Cambridge,	2 25	....	2 00	....
Salem,	2 25	1 75	1 85	1 75
Newburyport,	2 50	2 00	1 95	1 80
Portsmouth,	2 50	1 75	1 90	1 80
Rockport,	....	....	1 90	....
Saco,	2 75	1 75	1 90	1 75
Portland,	2 00 to 2 25	1 75	1 80	....
Bangor,	2 00 to 2 25	....	1 80	1 80
Bath,	2 25	....	2 00	....
Middletown,	....	....	....	....
Amesbury,	2 70	....	....	....
Boston,	2 25	....	....	....
Cambridgeport,	2 25	....	....	....
Taunton,	2 50	....	....	....
Derby,	2 00	1 25	....	....
New-York,	1 55	55	....	....
Hackensack,	1 75	....	....	....
Jersey City,	1 65	35	....	....

Freights.—Continued.

To River Ports.				
Troy,	1 75	95	60	65
Albany,	1 75	90	55	50
Coeyman's,	1 60	....	55	50
Stuyvesant,	1 50	....	50	45
Coxsackie,	1 60	....	45	45
Hudson,	....	1 00	40	50
Catskill,	....	....	40	35
Poughkeepsie,	1 60	75	30	25
Fishkill,	1 60	....	20	30
Cold Spring,	1 60	70	30	50
Haverstraw,	....	50	45	55
Nyack,	1 60	50	55	50
Sing Sing,	1 60	....	60	50
Yonkers,	....	40	60	55
New-York,	1 55	50	70	
Saugerties,	1 55	....	35	30
Rhinebeck,	1 60	....	30	35
Rondout,	1 60	60	30	25
Tarrytown,	1 60	80	60	....
West Point,	1 60	75	30	50

Rates of Transportation to Tide Water.

[BY RAILROAD.]

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkil Haven,	$2 50

From Port Carbon, 7 cents per ton more.

TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton,	$1 15
C. R. R., N. J., Easton to Elizabethport,	1 70
	$2 85
Shipping Expenses at Elizabethport,	25
Total,	$3 10

TO PORT JOHNSON.

L. V. R. R.,	$1 15
C. R. R. of N. J.,	1 80
Shipping Expenses,	25
Total,	$3 20

TO HOBOKEN.

L. V. R. R.,	$1 15
Morris & Essex R. R.,	1 80
Shipping Expenses,	25
Total,	$3 20

TO SOUTH AMBOY.

L. V. R. R.,	$1 15
B. & D. R. R.,	1 10
Camden & A. R. R.,	50
Shipping Expenses,	25
Total,	$3 00

Metals.

IRON.—Duty: Bars, 1 to 1½ cents ₩ lb; Railroad, 70 cents ₩ 100 lbs.; Boiler and Plate, 1½ cents ₩ lb; Sheet, Band, Hoop, and Scroll, 1½ to 1¾ cents ₩ lb; Pig, $9 ₩ ton; Polished Sheet, 3 cents ₩ lb.

Pig, Scotch, No. 1, ₩ ton,	38 —@43 —
Pig, American, No. 1,	42 — — —
Pig, American, No. 2,	38 — 39 —
Pig, American, Forge,	36 — — —
Bar, Refined, English and American,	85 — — —
Bar, Swedes, assorted sizes (gold),	82 50 87 50

STORE PRICES.

Bar, Swedes, ord'y sizes,	less 5 ₩ ct., — — 140 —
Bar, Refined,	less 5 ₩ ct., 90 — 92 50
Bar, Common,	less 5 ₩ ct., 85 — 87 50
Scroll,	less 5 ₩ ct., 120 — 150 —
Ovals and Half-round,	less 5 ₩ ct., 117 50 142 50
Band,	less 5 ₩ ct., 117 50 — —
Horse Shoe,	less 5 ₩ ct., 117 50 — —
Rods, ¾ to 3-16 inch,	less 5 ₩ ct., 97 50 155 —
Hoop,	less 5 ₩ ct., 125 — 180 —
Nail Rod, less 5 ₩ ct.,	8¼ — 9¼
Sheet, Russia, as to Nos. (gold),	— 11 — 12¼
Sheet, Single, D. and T. Common,	— 5 — 7
Sheet, Galvanized,	List 20 @ 25 ₩ cent dis.
Rails, English (gold), ₩ ton,	— — 56 50
Rails, American, at Works in Pa.,	74 00 76 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₩ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ₩ lb; over 11 cents, 2½ cents ₩ lb, and 10 ₩ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₩ lb,	— 18 @ — 22
English Spring (2d and 1st quality),	— 9 @ — 11½
English Blister (2d and 1st quality),	— 11½@ — 19
English Machinery,	— 12½@ — 15
English German (2d and 1st quality),	— 14 @ — 16
American Blister. "Black Diamond,"	— 10½@ — 16
American, Cast, Tool, "	— 19 @ — —
American, Spring, "	— 10 @ — 13
American Machinery, "	— — @ — 13
American German, "	— 10 @ — 13

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper cents ₩ lb; Manufactured, 45 per cent ad val.

	All Cash.
Copper, New Sheathing, ₩ lb,	— @ — 32
Copper Bolts,	— @ — 33
Copper Braziers, 16oz. and over,	33 @ — 35
Copper Nails,	38 @ — 40
Copper, Old Sheathing, etc., clean,	20 @ — 21
Copper, Chili Pig,	— @ — —
Copper, American Ingot,	23 @ — 23½
Yellow Metal, New Sheathing,	— @ — 27
Yellow Metal Bolts,	— @ — 27
Yellow Metal Nails,	— @ — 27

LEAD.—Duty: Pig, $2 ₩ 100 lbs.; old Lead, 1½ cts. ₩ lb; Pipe and Sheet, 2½ cents ₩ lb.

Galena, ₩ 100 lbs,	— — @ — —
Spanish (gold),	$6 32½@ $6 50
German "	6 37½@ 6 50
English "	6 40 @ 6 87½
Bar, (net.)	9 00 @ — —
Pipe and Sheet, "	9 22½@ — —

TIN.—Duty: Pig, Bars, and Block, 15 ₩ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₩ cent. ad val.

	Gold. ₩ lb.
Banca,	— @ — 37
Straits,	31½@ — 32
English,	31½@ — —

Plates.	Gold.	Currency.
Fair to good brands,		
I. C. Charcoal, ₩ box,	$8 50 @ $8 62½	$11 75 @ $12 00
I. C. Coke,	7 00 @ 7 50	9 75 @ 10 75
Coke Terne,	— @ 6 00	— @ 8 50
Charcoal Terne,	8 00 @ 8 25	11 00 @ 11 50

SPELTER.—Duty: In Pigs, Bars, and Plates, $1.50 ₩ 100 lb.

	Gold.
Plates, Foreign, ₩ 100 lb.	$6 37½@ $ —
Plates, Domestic, ₩ lb.	11 @ 12

REMARKS.

IRON.—The demand for Scotch Pig has partially subsided; but as holders offer their stocks sparingly, prices are sustained. We note sales of 600 tons Eglinton at $38; and from yard, 200 do. Gartsherrie, $41. There has been more inquiry for American, and the market is firm at rates previously current; 200 tons No. 2 Crane sold at $39; 1000 do. No. 1, and 400 do. Gray Forge, on terms not made public. New Rails continue in request, and we notice sales of 1000 tons English at $56.50 gold. Sales have been made of 200 tons Wrought Scrap, from yard, part at $47 cash. The manufacturers of Iron, who had a meeting at Pittsburg, resolved to advance the price of Refined Bar to 3¼c. @ 3½c. ₩ lb. at Philadelphia and Pittsburg, bringing it to about $85.40 delivered here. So far, the action of the makers, has not affected store prices

here, though sellers are firmer, and if all the makers agree and adhere to the new price, there will, of necessity, be an advance here. Singles Sheet are quoted 4¼c. at Pittsburg.

COPPER has been quiet but steady at 23c. for Lake and Baltimore, with sales of 600,000 lbs. for the week. For September, 200,000 lbs, and for October, 100,000 lbs have been sold at 23½c. @ 23¾c. The manufacturers have bought as yet little. The mining companies have sold largely, and are not at present in the market.

The London market declined in the middle of August to £66 for Chili, but recovered to £67.

TIN.—Steady and without wholesale business. The stock in first hands is held at 32c. for Straits; but the dealers job at ¼c. less. Banca, without stock, nominal, 37c. English, 31½c. gold.

LEAD is $6.37½ gold for ordinary foreign from ship. The stock in store is small; the trade hold small lots at 6½c.

SPELTER quiet at $6.37½ gold for Silesian.

ZINC.—Dry American, 8c. @ 8¼c.; Dry French, 11¼c. @ 2c.; Metallic, 12c.; Duty, 2¼c. per pound.

MANGANESE.—Pembroke Brand Black Oxide Manganese, Powered, 5c.; Lump, 4½c.

Mining Stocks.

NEW-YORK, August 26th, 1869.

AMONG the most recent sales at the Mining Board we notice Smith & Parmelee, at $2.75 @ $2.85; Gregory, at $2; Grass Valley, at 30c. @ 31c.; Wallkill Lead, assented, 18c., and Union Petroleum, at $15. The following is the list of quotations:

Benton Gold	$ 10	—
Black Hawk Gold	..	—
Consolidated Gregory	1 95	2 05
Grass Valley	32	—
Gunnell Gold	—	—
La Crosse Gold	15	—
Mariposa	7 00	8 75
" pfd	11 00	13 00
Montana Gold	—	12
Quartz Hill	1 05	1 15
Smith & Parmelee Gold	2 80	2 90
Quicksilver	13½	16
Wallkill Lead	9	19
" assented	17	19
Tudor Lead	4 20	—
Cumberland Coal	35	36
Beunchoff Petroleum	25	—
Buchanan Farm	54	60
Central	65	69
Home Petroleum	5 00	6 50
National	50	2 00
N. Y. & Alleghany	50	80
Northern Light	45	—
Pithole Creek	1 70	2 05
Rynd Farm	25	30
United Petroleum Farms	17	20
United States	—	1 00
Phillips	10	—
Union	15 00	—

San Francisco Stock Market.

SAN FRANCISCO, CAL., August 25, 1869.

Stocks.	*Bid per ft.*	*Share*
Gould & Curry	86	
Savage	51½	50½
Chollar Potosi	19½	19¼
Ophir	17	
Hale & Norcross	117	15
Crown Point	28	27½
Yellow Jacket	46½	45½
Belcher	19½	18
Imperial	48	
Alpha		
Kentuck	177	175

Cumberland Coal and Iron Co.

Semi-Bituminous Coal from the Hoffman, Astor, and Eckhart Mines, for Steam and Manufacturing Purposes. Delivered at New-York, Georgetown, or Baltimore. Office, No. 90 BROADWAY, corner of Wall Street, New-York.

WM. M. RICHARDS, President, New-York.
E. H. TRACY, Eng. and Supt., Cumberland, Md.
Aug. 31-tf

BURLEIGH'S PATENT

PNEUMATIC ROCK DRILL

Is now in successful working operation in New-York, Chicago, Jersey City; also at the Hoosac Tunnel (Mass.), Lake Superior, Colorado, and Nova Scotia Mines, Union Pacific and Boston and Hartford Railroads; also in deepening the beds of the Illinois and Michigan Canals, and Des Moines Rapids, and numerous other localities.

J. T. & W. H. DALY,

43 New Street, New-York,

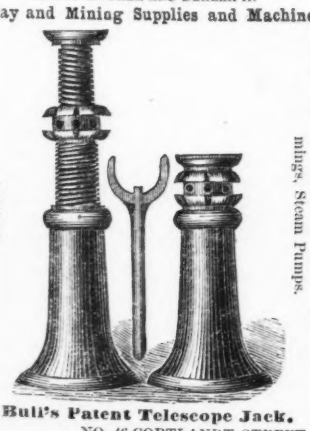
General Agents for the United States and Europe.
Aug. 31-2mo.

ALBERT BRIDGES,

MANUFACTURER AND DEALER IN

Railway and Mining Supplies and Machinery.

Hot and Cold Punched Nuts, Bolts, Lag Screws and Washers.



Belting, Packing Hose, Rubber Springs, Car Trimmings, Steam Pumps.

Bull's Patent Telescope Jack.

NO. 46 CORTLANDT STREET,

P. O. Box, 2843. NEW-YORK.
Aug. 31-1y

COAL SHIPPERS.

74th AUCTION SALE.

80,000 TONS SCRANTON COAL,

On Wednesday, September 1st, 1869.

NEW-YORK, August 26th, 1869.

The Delaware, Lackawanna and Western Railroad Company will sell, by Messrs. John H. Draper & Co., Auctioneers, at the Company's Salesroom, 26 Exchange Place, corner of William Street, New-York, on Wednesday, Sept. 1st, at 12 o'clock, noon,

80,000 TONS

of Coal, from the Lackawanna Regions, of the usual sizes, deliverable at their Depot, Elizabethport, N. J., during the month of September, 1869.

The sale will be positive; each lot put up will be sold to the highest bidder; no bids, in any form whatever, being made for account of, or on behalf of the Company. The conditions will be fully made known at time of sale.

TERMS: Fifty cents per ton, payable in current funds, on the day of sale, and the balance, within ten days thereafter, if required at the Office of the Company.

Aug. 27-1t. **SAMUEL SLOAN, President.**

E. B. ELY & CO.,

SHIPPERS OF

COAL,

33 Trinity Building, 111 Broadway, NEW-YORK.

"Old Company's" Lehigh, J. H. Swoyer's Enterprise, Wyoming, Wilkesbarre, and Locust Mountain Bituminous Coal.

E. B. ELY. S. W. ELY.
Apr. 24-1y-q

POWELTON COAL AND IRON CO.,

SOLE MINERS AND SHIPPERS

Of the celebrated

POWELTON

Semi-Bituminous Gas and Anthracite Coals,

104 WALNUT STREET, PHILADELPHIA.

BRANCH OFFICES:

New-York, Trinity Building; 17 Doane-street, Boston; Cleveland, O; Pittsburgh, Pa. Jan. 30-6m-is.

SAMUEL BONNELL, JR.,

Offers for Sale his

SUGAR CREEK

AND

HONEY BROOK

LEHIGH COALS,

OFFICE—43 AND 45 "TRINITY BUILDING," 111 BROADWAY, N. Y.

HONEY BROOK COAL COMPANY,

Exclusive Miners and Shippers of the Celebrated

HONEY BROOK LEHIGH COAL,

No. 111 BROADWAY, NEW-YORK.

JAS. H. LYLES, Agent.

Wharves, Port Johnson, N. J. Philadelphia Office, 209 Walnut-street.
Apr. 20 1y **J. B. McCREARY, President.**

WILKESBARRE COAL,

Delivered Direct from the Mines of

The Wilkesbarre Coal and Iron Co.,

OR FOR RESHIPMENT AT

HOBOKEN AND JERSEY CITY.

Office, No. 80 Broadway,

April 1-1y NEW-YORK.

WHITE, FOWLER & SNOW,

Successors to JOHN WHITE & CO.,

Wilkesbarre and Lehigh Coal,

FOR STEAM AND FAMILY USE.

OFFICE,

ROOM NO. 75, 111 BROADWAY (Trinity Building).

JNO. WHITE. LINDLEY H. FOWLER. LOUIS T. SNOW.
Jan. 1-1y

COXE BRO.'S & CO.,

Cross Creek Colliery,

Miners and Shippers of the Celebrated

Cross Creek Free Burning Lehigh Red Ash Coal.

FROM THE BUCK MOUNTAIN VEIN.

OFFICES:

Philadelphia, No. 341 Walnut Street. | Drifton, Jeddo P. O., Luzerne Co., Pa.

Agent in New-York, SAMUEL BONNELL, JR., Room 43, Trinity Building,
Feb.-1y 111 Broadway.

H. N. BURROUGHS, Pres't. H. T. SHILLINGFORD, Sec'y. H. H. SHILLINGFORD, Treas.

KITTANING COAL COMPANY,

SOLE MINERS AND SHIPPERS OF

BITUMINOUS COAL,

FROM THE COLLIERIES:

Tunnel Hill (LEMON VEIN), Gallitzin Cambria Co.
Beaverton (PHŒNIX VEIN), Osceola Mills, Clearfield Co.

Unequalled for Steam, Rolling Mills, Forges, Glass Works, Brick Kilns, Lime Kilns, and Coke, for the Manufacture of Steel, etc.

OFFICE:

125 South Fourth Street (Forrest Place).
July 6-6mo

PICTOU COAL!

The undersigned are prepared to contract for the delivery of *this well-known* COAL, either on board vessel at Pictou, or at any port in the United States.

Sample parcels sent as required.

BIRD, PERKINS & JOB,

39 INDIA WHARF, 86 SOUTH ST.,
Aug. 10-3m Boston. New-York.

COAL SHIPPERS.

Pier No. 14 North Pt. Richmond.

C. J. & J. H. EASTWICK & CO.,

SHIPPERS OF

WHITE AND RED ASH COAL.

No. 228 DOCK STREET, PHILADELPHIA, and No. 19 DOANE STREET, BOSTON.

BURNSIDE RED ASH, SHAMOKIN WHITE ASH, LOCUST MOUNTAIN WHITE ASH COAL.

Jan.1y-is s.a.

THE DESPARD COAL COMPANY

OFFER THEIR SUPERIOR

DESPARD COAL

To Gas Light Companies throughout the country.

MINES IN HARRISON COUNTY, West Virginia.
WHARVES, LOCUST POINT, COMPANY'S OFFICE, No. 29 South St., } Baltimore.

AGENTS:

PARMELE BROTHERS, No. 32 Pine St., New-York.
BANGS & HORTON, No. 31 Doane Street, Boston.

Among the consumers of Despard Coal we name: Manhattan Gas Light Co., New-York; Metropolitan Gas Light Co., New-York; Jersey City Gas Light Co., Jersey City, N. J.; Washington Gas Light Co., Washington, D. C.; Portland Gas Light Co., Portland, Me.

☞ Reference to them is requested. May 30-1y

LEWIS AUDENRIED & CO.,

Miners and Shippers of the following celebrated

ANTHRACITE COALS.

From Philadelphia and the Mines.

DIAMOND, Red Ash; SPOHN, Red ASH; ORCHARD, Pink Ash; BROAD MOUNTAIN, White Ash; LOCUST MOUNTAIN, White Ash; BLACK HEATH, White Ash OLD COMPANY'S LEHIGH; WILKESBARRE.

From Port Johnston and Jersey City,

OLD CO.'S LEHIGH, HAZLETON, WILKESBARRE, AND SHENANDOAH COALS.

Also the superior CUMBERLAND COALS,

BROAD TOP, SEMI-BITUMINOUS, at Philadelphia.
BARTON, GEORGES CREEK, at Baltimore.
BARTON, GEORGES CREEK, at Alexandria.

205 Walnut Street, PHILADELPHIA; 14 Kilby Street, BOSTON; 34 Westminster Street, PROVIDENCE; 24 Second Street, BALTIMORE.

110 BROADWAY, NEW-YORK.

July 13-1y

English Coal and Cannel.

DESPARD COAL, from Baltimore,
PROVINCIAL COAL,
ANTHRACITE COAL.

For sale in lots to suit.

PARMELE BROS.,

Agency of OSCAR I. VAN WART, Liverpool.

OFFICE, No. 32 PINE STREET, NEW-YORK.

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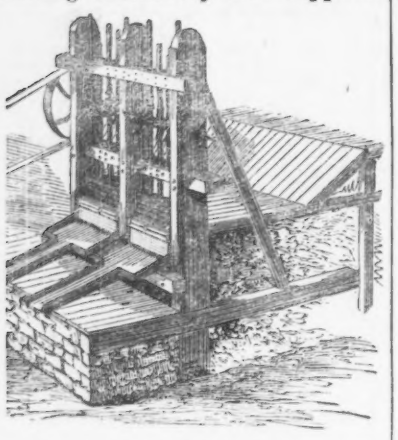

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The **Mechanical Combinations** are extremely simple, the machines therefore correspondingly durable. A continuous self-delivery of ore on one side and tailings on the other is effected, hence very little attention is required except keeping the hopper supplied with ore. The power of one man is sufficient to operate a machine that will concentrate one ton per hour.

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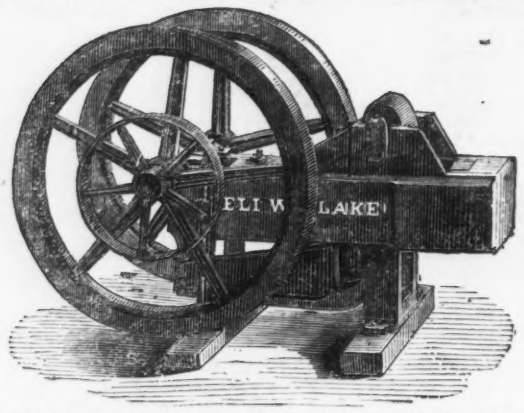

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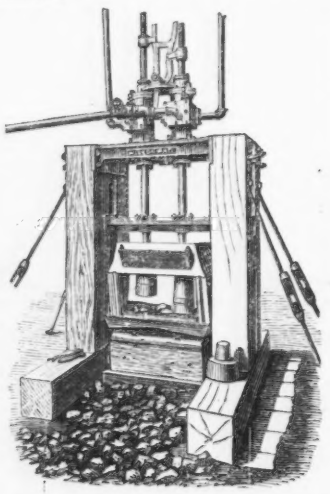

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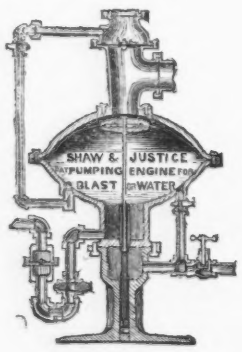

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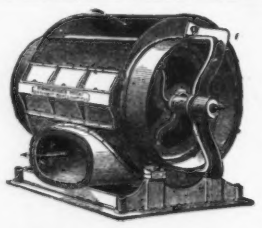

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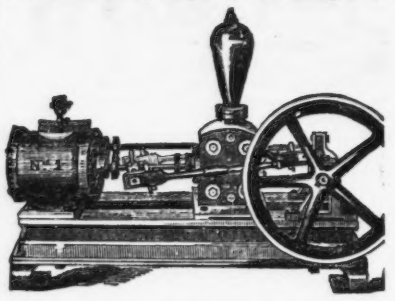

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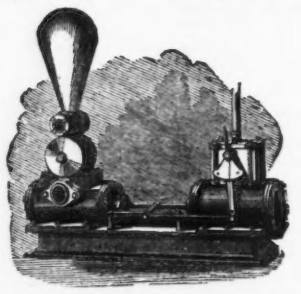

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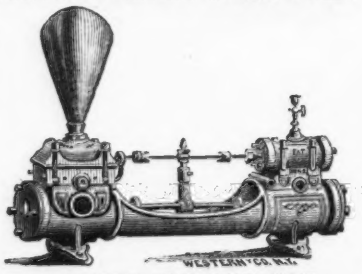

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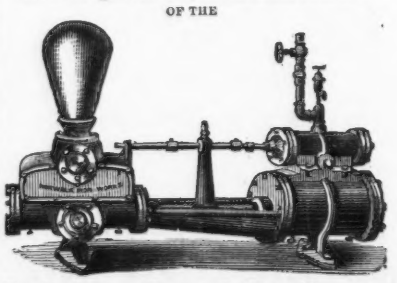

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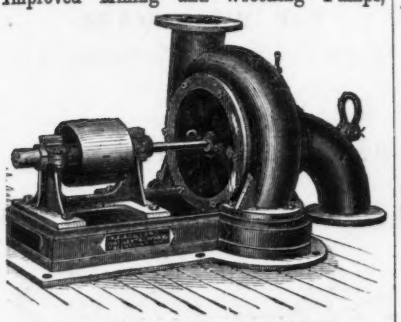

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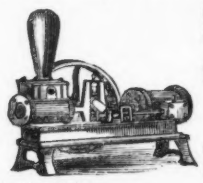

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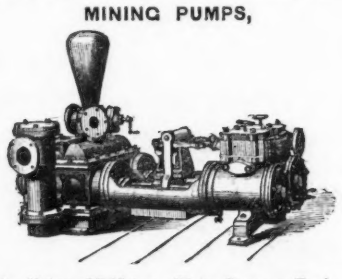

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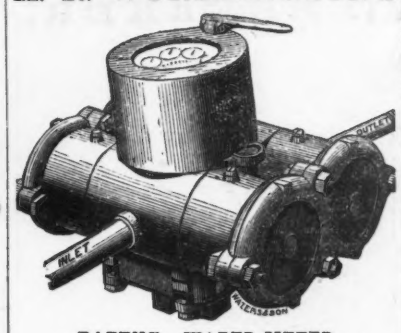

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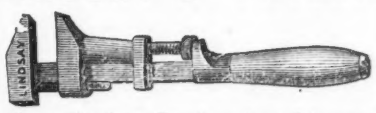

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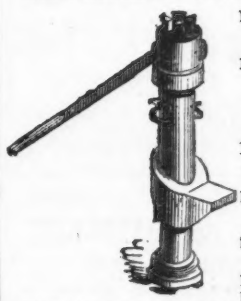

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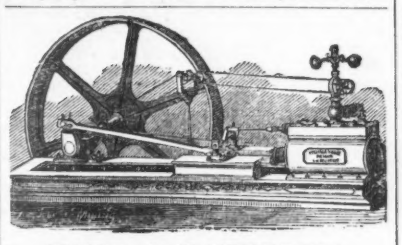

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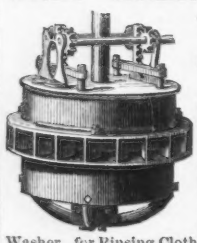

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